THE JOURNAL OF

MEDICAL EDUCATION

OFFICIAL PUBLICATION OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES



MAY 1960 . VOLUME 35 . NUMBER 5

- 385 Education for a Learned Profession J. Douglas Brown
- 388 Medical Schools in Wartime Stanley W. Olson and J. R. Schofield
- 398 Teaching of Quantitative Physiology G. J. Millar and L. B. Jaques
- 404 The Internship: Factors in Choice and Level of Satisfaction Ralph W. Heine
- 409 The Use of Experiments in Undergraduate Teaching of Pathology: Report of a Conference at Western Reserve University

 Donald B. Hackel
- 416 The Placebo Effect in Medical Education Paul J. Sanazaro
- 421 Samuel Henry Dickson (1798–1872) Joseph Ioor Waring
- 429 The Teacher in the Medical School Martin G. Netsky
- 435 The Jacksonville Experiment in Graduate Medical Education Max Michael, Jr.
- 440 The Honor System in United States and Canadian Medical Schools Ralph D. Tanz and Rose T. Tanz
- 447 Medical Education Forum; Abstracts from the World of Medical Education; New Books
- xxii News in Brief

Presenting . . .

A stimulating, new basic text in neuroanatomy using a functional, yet systematic approach

A FUNCTIONAL APPROACH TO NEUROANATOMY

By

Earl Lawrence House, Ph.D. and Ben Pansky, Ph.D.

Prepared with the needs of the medical student continually in mind, this work presents basic neuroanatomy in a stimulating fashion. Using a functional, yet systematic, approach the authors integrate clinical considerations into practically every chapter, including testing and symptoms of neurologic disorders. Every chapter includes a summary at the end which correlates the material in that chapter and aids the

student's review of it. Throughout the text there is continual reference to gross anatomy and embryology in an effort to develop an understanding of the nervous system in relation to other systems. The inclusion of an atlas of brain sections enables the student to better orient his thinking and learning, while the addition of actual case histories points up the importance of neuroanatomy to clinical practice.

Special features of this book:

- * Student-oriented to assure the fulfillment of the students' needs.
- ★ Over 300 newly executed black and white illustrations carefully prepared by Dr. Pansky serve to amplify and clarify the students' understanding of the written material. An Atlas of Brain Sections is included.
- * Clear, succinct chapter summaries facilitate the students' review.
- * Clinical considerations included in nearly every chapter have been carefully reviewed by neurologists and other practitioners for their aptness and clarity.
- * Correlations to gross anatomy and embryology indicated.
- ★ Inclusion of a chapter of actual case histories emphasizes the applications of neuroanatomy.

479 pages, plus index, 71×97, illustrated

The Blakiston Division
McGRAW-HILL BOOK COMPANY, Inc.

330 West 42nd St. New York 36, N.Y. 68 Post St. San Francisco, Calif.

EFFECTIVE STUDENT TEXTS FROM SAUNDERS

MAXIMOW AND BLOOM— TEXTBOOK OF HISTOLOGY

Students will find an unparalleled visualization of human tissues in this text. It presents an excellent study of the structure of each part of the human body as seen both microscopically and submicroscopically. Location, composition, appearance, structure and differentiating characteristics of each tissue are carefully described in rich detail. Function is skillfully integrated into the discussions. The 1082 illustrations (265 in color) are one of the finest collections ever published.

By Alexander A. Maximow, Late Professor of Anatomy, University of Chicago; and William Bloom, Professor of Anatomy, University of Chicago. 628 pages, 7" × 10", with 1082 illustrations, 265 in color. \$11.00.

GARDNER, GRAY AND O'RAHILLY— ANATOMY

NEW

This unique new book follows the most modern concepts in its presentation of anatomy. Its approach is regional—matching the manner in which students actually dissect. The most recent advances in understanding of anatomy and use of anatomical knowledge in medicine and surgery are here. The illustrations, all prepared specifically for this book, are designed to show aspects of structure not apparent in the usual atlas. Paris nomenclature is used throughout, with older synonyms noted.

By Ernest Gardner, M.D., Professor and Chairman of the Department of Anatomy, Wayne State University; Donald J. Gray, Ph.D., Professor of Anatomy, Stanford University; and Ronan O'RAHILLY, M.Sc., M.D., Associate Professor of Anatomy, Wayne State University. 999 pages, 7" × 10", with 568 line drawings plus 64 radiographic plates. \$15.00.

New!

LEAVELL AND THORUP—FUNDAMENTALS OF CLINICAL HEMATOLOGY

Here is a new textbook designed for the student who is being introduced to hematology for the first time. Emphasis is on abnormal mechanisms responsible for the manifestations of hematologic diseases. Actual cases illustrate the discussions of most of the clinical syndromes. Careful consideration has been given to diagnosis of such diseases as anemia, hemorrhagic diathesis, lymphadenopathy, etc. Separate material is devoted to hematologic laboratory techniques.

By BYRD S. Leavell, M.D., Professor of Medicine; and Oscar A. Thorup, M.D., Assistant Professor of Internal Medicine, School of Medicine, University of Virginia. 503 pages, 61" × 92", illustrated, with 4 in color. About \$11.00.

New—Just Ready!

NEW

Gladly sent to teachers for consideration as texts

W. B. SAUNDERS COMPANY

West Washington Square, Philadelphia 5, Pa.

THE JOURNAL OF MEDICAL EDUCATION

Official Publication of the Association of American Medical Colleges

EDITORIAL OFFICE

University Hospitals, School of Medicine, University of Wisconsin, Madison 6, Wisconsin, ALpine 6-6811

JOHN Z. BOWERS, Editor-in-Chief ELIZABETH B. POHLE, Assistant Editor

OFFICE OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

2530 Ridge Avenue, Evanston, Illinois, DAvis 8-9505

NEVA V. RESEK, News Editor HELEN CLAIRE HERMAN, Advertising

EDITORIAL BOARD

STANLEY E. BRADLEY JOHN A. D. COOPER JULIUS H. COMROE, JR. JOHN Z. BOWERS, Chairman
T. HALE HAM
GEORGE HARRELL
WILLIAM N. HUBBARD, JR.

VERNON W. LIPPARD WILLIAM F. NORWOOD KENNETH E. PENROD

INFORMATION FOR SUBSCRIBERS

The Journal of Medical Education is owned by the Association of American Medical Colleges and published monthly by the University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illinois. Second-class postage paid at Chicago, Illinois.

paid at Chicago, Illinois.
Subscription Rates: \$7.00 per year, \$13.50 two years, \$19.50 three years, \$1.00 per single copy; foreign,
\$8.00 per year, \$15.50 two years, \$22.50 three years, \$1.25 per single copy; Pan America and Canada,
\$7.50 per year, \$14.50 two years, \$21.00 three years. Supplements, \$2.00.

Copyright May 1960 by the Association of American Medical Colleges.

INFORMATION FOR CONTRIBUTORS

The Journal of Medical Education serves as an international medium for the exchange of ideas in medical education, as well as a means of communicating the policies, programs, and problems of the Association. The Editorial Board welcomes the submission of manuscripts concerned with the broad field of medical education; this includes preparation for medical education; the medical school experience; intern and resident education graduate and postgraduate medical education. The Editorial Board recognizes that medical education includes the activities of faculty, students, administrators, and those of the practicing profession who also teach and learn. Thus, it invites communications from any of these sources.

Manuscripts should be submitted in duplicate. All manuscripts are reviewed by the Editorial Board before acceptance for publication. All copy, including footnotes, tables, and legends, should be typed double-spaced. Each diagram or graph or photograph should have a brief legend. Each table should be typed on a separate sheet of paper. References should refer to published material only, must be submitted in alphabetical order, and should include, in order: author, title, journal abbreviation (Quarterly Cumulative Index Medicus form), volume number, page, and year; book references should also include editors, edition, publisher, and place of publication.

Galley proofs will be mailed to authors for correction before publication and should be returned within 48 hours after receipt.

Reprints may be ordered, when galley proofs are returned, from the University of Chicago Press, in multiples of 50, at a price depending on the length of the article; prices are listed on the reprint order form.

Medical Education Forum includes editorials, letters, comments, criticisms, and excerpts from important

addresses.

News from the Medical Schools: Material for this section should be transmitted to the News Editor, Miss Neva Resek, 2530 Ridge Avenue, Evanston, Illinois. Announcements of major faculty and administrative appointments, news of distinguished visitors and significant educational developments will be included. It is not possible to publish notices on grants-in-aid for scientific research.

Items of Current Interest: Audio-visual news and notices from national and federal agencies appear in this section.

CORRESPONDENCE

Address all correspondence regarding manuscripts, editorials, and letters to the Editor to the Editorial Office, University Hospitals, University of Wisconsin, Madison 6, Wisconsin.

Address all correspondence concerning subscriptions, reprints, changes of address, and back numbers to the University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illinois. All changes of address should provide both the old and the new address.

Address all correspondence concerning news, announcements, and personnel exchange to the office of the Association of American Medical Colleges, & Miss Neva Resek, 2530 Ridge Avenue, Evanston, Illinois; address all correspondence concerning advertising to Miss Helen Claire Herman, 2530 Ridge Avenue, Evanston, Illinois.

PRINTED IN U.S.A.

Cole & Elman

TEXTBOOK OF SURGERY

by WARREN H. COLE with 49 CONTRIBUTING and CONSULTING AUTHORS

This complete, well organized text presents the best of modern surgical thought and teaching for the student, the graduate trainee in surgery and the physician in need of an authoritative surgical reference.

AUTHORSHIP FROM 27 MEDICAL SCHOOLS

CONTRIBUTORS CONSULTANTS

LeRoy C. ABBOTT Willard M. ALLEN William A. ALTEMEIER R. Kirklin ASHLEY H. Glenn BELL Frank B. BERRY Alfred BLALOCK Thomas H. BURFORD Jack A. CANNON Robert J. COFFEY Warren H. COLE Frederick A. COLLER *Denton Arthur COOLEY E. Stanley CRAWFORD *Oscar CREECH, Jr. *Michael DeBAKEY *Clarence DENNIS *R. D. DRIPPS J. Englebert DUNPHY *Charles ECKERT Robert ELMAN Thomas B. FERGUSON Paul W. GREELEY R. Arnold GRISWOLD *James D. HARDY *William D. HOLDEN *John M. HOWARD Charles G. JOHNSTON *Edward T. KREMENTZ *William P. LONGMIRE Charles C. LUND Champ LYONS Cyril MacBRYDE *Francis M. McKEEVER *Leland S. McKITTRICK
*George C. MORRIS, Jr. JUNE 1959 EDITION. *Carl A. MOYER John H. MULHOLLAND Reed M. NESBIT °E. J. POTH °I. S. RAVDIN *William H. REOUARTH °C. P. RHOADS

*John SCHNEEWIND

*Roger D. WILLIAMS Philip D. WILSON

*Nathan A. WOMACK *Robert M. ZOLLINGER

Carlo S. SCUDERI W. Eugene STERN New to this edition are 32 (names starred) of the 50 contributing authors and consultants who have been drawn from representative schools and hospitals throughout the country to present an excellent compilation of surgical knowledge in all fields except ophthalmology and otorhinolaryngology.

ALL ASPECTS OF SURGERY INCLUDED

All phases of the subject are included with anatomy and pathophysiology integrated with the practical description of clinical manifestations, diagnosis, operating principles, nonsurgical treatment, general management and much detailed technic for minor surgical conditions.

CANCER AND HEART SURGERY EXPANDED

Laboratory tests and aids; chemotherapy; traumatic injuries; systemic reaction to trauma; incidence, etiology, dissemination, diagnosis and treatment of cancer; congenital and acquired lesions of the heart and great vessels; medical conduct and ethics are clearly and concisely included. The 297 new illustrations increase the total to more than 1000 on 613 figures.

NEW FORMAT AND NEW ILLUSTRATIONS

New illustrations, expanded coverage, much entirely new material, heavy rewriting, and extensive revision combined with the format of a two-column page have resulted in a book of greatly increased usefulness. As a text for basic instruction and as a guide in preparing for "board" examinations or practice the new Cole & Elman TEXTBOOK OF SURGERY is up to date in every respect.

1248 PAGES.

1000 ILLUS.

\$17.00

ALSO NEW

John Borrie's MANAGEMENT OF EMERGENCIES IN THORACIC SURGERY. 1958 \$10.00

John Madden's ATLAS OF TECHNICS IN SURGERY.

1958 \$30.00

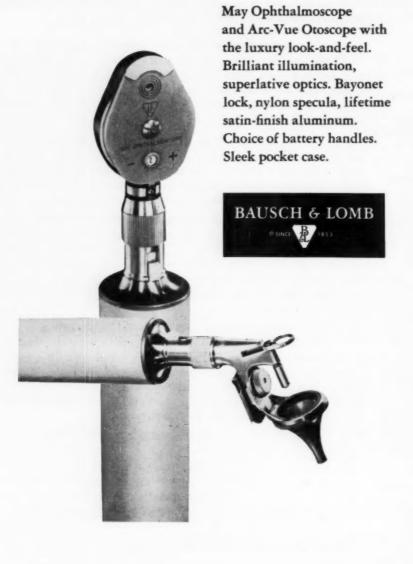
Orvar Swenson's PEDIATRIC SURGERY.

1958 \$20.00

APPLETON-CENTURY-CROFTS, INC.

35 W. 32nd St., New York 1, N. Y.

Never any compromise with quality



LIVING...



... goes on much the same for the new diabetic on ORINASE*

There was a time when, for many patients, a diagnosis of diabetes mellitus meant abrupt and radical departure from a normal way of living. The constraint of rigid management often forced painful adjustments at an age when changes are not easily effected. With Orinase, however, three out of four diabetics can continue in their normal occupations, and family, social, and community activities are rarely impeded.

The majority of new diabetics past the age of 30 deserve a trial on Orinase . . . first.

*TRADIHARK, REG. U. E. PAT. OFF. - TOLBUTAMIDE, UPJOHN

ORINASE &



THE UPJOHN COMPANY KALAMAZOO, MICHIGAN

An exclusive methyl "governor" prevents hypoglycemia

Calendar of Meetings

ASSOCIATION OF AMERICAN

MEDICAL COLLEGES

71st Annual Meeting, October 31-Nov. 2, 1960 Diplomat Hotel, Hollywood, Fla.

MAY

AMERICAN ASSOCIATION ON MENTAL DEFICIENCY, Lord Baltimore Hotel, Baltimore, May 16-21. Mr. Neil A. Dayton, P.O. Box 51, Mansfield Depot, Conn., Executive Secretary-Treasurer.

tary-freasurer.

American Association of Plastic Surgeons, Milwaukee Inn, Milwaukee, May 17-20. Dr. Thomas D. Cronin, 6615 Travis St., Houston 25, Texas, Secretary.

American Gynecological Society, Williamsburg Inn, Williamsburg, Va., May 30-June 1. Dr. Andrew A. Marchetti, Georgetown Univ. Hosp., Washington 7, D.C., Secretary.

AMERICAN OPHTHALMOLOGICAL SOCIETY, The Broadmoor Colorado Springs, Colo., May 16-18. Dr. Maynard C Wheeler, 30 W. 59th St., New York 19, Secretary. AMERICAN ORTHOPAEDIC ASSOCIATION, The Homestead, Hot Springs, Va., May 30-June 2. Dr. Lee Ramsay Straub, 535 E. 70th St., New York 21, Secretary.

E. 70th St., New York 21, Secretary.

AMERICAN TRUDEAU SOCIETY, Statler and Biltmore Hotels,
Los Angeles, May 16-18. Mr. Frank W. Webster, 1790
Broadway, New York 19, Executive Secretary.

AMERICAN UROLOGICAL ASSOCIATION, INC., The Palmer
House, Chicago, May 16-19. Mr. William P. Didusch,
1120 N. Charles St., Baltimore 1, Executive Secretary.

ASSOCIATION, OF AMERICAN PHYSICIANS, Haddon Hall At-

Association of American Physicians, Haddon Hall, Atlantic City, N.J., May 3-4. Dr. Paul B. Beeson, Yale Univ. School of Medicine, New Haven 11, Conn., Secre-

MEDICAL LIBRARY ASSOCIATION, INC., Muehlebach Hotel, Kansas City, Mo., May 16-20. Miss Nettie A. Mehne, Upjohn Company Library, 301 Henrietta St., Kalamazoo, Mich., Secretary.

NATIONAL TUBERCULOSIS ASSOCIATION, Statler & Biltmore Hotels, Los Angeles, May 15-20. Mr. James G. Stone, 1790 Broadway, New York 19, Executive Secretary.

AMERICAN ACADEMY OF TUBERCULOSIS PHYSICIANS, Miami Beach, Fla., June 11. Dr. George P. Bailey, P.O. Box

7011, Denver 6, Secretary.

American College of Chest Physicians, Miami Beach, Fla., June 8-12. Mr. Murray Kornfeld, 112 E. Chestnut St., Chicago 11, Executive Director.

AMERICAN DIABETES ASSOCIATION, INC., Hotel Deauville, Miami Beach, Fla., June 11-12. Mr. J. Richard Connelly, 1 E. 45th St., New York 17, Executive Director.

AMERICAN ELECTROENCEPHALOGRAPHIC SOCIETY, Statler Hilton Hotel, Boston, June 10-12. Dr. George A. Ulett, 1420 Grattan St., St. Louis 4, Secretary.

Grattan St., St. Louis 4, Secretary.

American Greiatrics Society, Americana Hotel, Miami Beach, Fla., June 9-10. Dr. Richard J. Kraemer, 2907 Post Road, Warwick, R.I., Secretary.

AMERICAN MEDICAL WOMEN'S ASSOCIATION, June 9-12. Mrs. Lillian T. Majally, 1790 Broadway, New York 19, Executive Secretary.

tive Secretary.

AMERICAN NEUROLOGICAL ASSOCIATION, Hotel Statler, Boston, June 13-15. Dr. Melvin D. Yahr, 710 W. 168th St., New York 32, Secretary. AMERICAN SOCIETY OF X-RAY TECHNICIANS, Netherland Hilton Hotel, Cincinnati, June 11-16. Genevieve J. Eilert, R.T., 16 Fourteenth St., Fond du Lac, Wis., Executive

Secretary.

AMERICAN THERAPEUTIC SOCIETY, Barcelona Hotel, Miami Beach, Fla., June 9-12. Dr. Oscar B. Hunter, Jr., 915 19th St., N.W., Washington 6, D.C., Secretary.

ASSOCIATION FOR RESEARCH IN OPHTHALMOLOGY, INC.,

ASSOCIATION FOR RESEARCH IN OPHTHALMOLOGY, INC., Miami, Fla., June 12-17. Dr. Lorand V. Johnson, 10515 Carnegie Ave., Cleveland 6, Secretary-Treasurer. ENDOCRINE SOCIETY, Eden Roc Hotel, Miami Beach, Fla., June 9-11. Dr. Henry H. Turner, 1200 N. Walker, Oklahoma City, Okla., Executive Secretary.

SOCIETY OF BIOLOGICAL PSYCHIATRY, Hotel Deauville, Miami Beach, Fla. June 10-12. Dr. George N. Thompson, 2010.

SOCIETY OF BIOLOGICAL PSYCHIATRY, Hotel Deauville, Miami Beach, Fla., June 10–12. Dr. George N. Thompson, 2010 Wilshire Blvd., Los Angeles 57, Executive Secretary.

SOCIETY FOR INVESTIGATIVE DERMATOLOGY, INC., Miami Beach, Fla., June 13–15. Dr. Herman Beerman, 255 S. 17th St., Philadelphia 3, Secretary-Treasurer.

SOCIETY OF NUCLEAR MEDICINE, Estes Park, Colo., June 22–25. Dr. Thad P. Sears, Veterans Administration Hospital, Denver 20, Chairman.

SOCIETY FOR VASCULAR SURGERY, Di Lido Hotel, Miami Beach, Fla., June 12. Dr. George H. Yeager, 314 Medical Arts Bldg., Baltimore 1, Secretary.

AMERICAN GOITER ASSOCIATION, Royal College of Surgeons, London, England, July 5-9. Dr. John C. McClintock, 149\(\frac{1}{2}\) Washington Ave., Albany 10, N.Y. Secretary. AMERICAN SOCIETY OF FACIAL PLASTIC SURGERY, Hotel Elysee, New York City, July 22. Dr. Samuel M. Bloom, 123 E. 83d St., New York 28, Secretary.

AUGUST

AMERICAN CONGRESS OF PHYSICAL MEDICINE AND REHA-BILITATION, Mayflower Hotel, Washington, D.C. Aug. 21-26. Mrs. Dorothea C. Augustin, 30 N. Michigan Ave.,

Chicago 2, Executive Secretary.

American Hospital Association, Civic Auditorium, San Francisco, Aug. 27-Sept. 1. Mr. Maurice J. Norby, 18 E. Division St., Chicago, Assistant Director.

Conference on the Chemical Organization of Cells:

NORMAL AND ABNORMAL, University of Wisconsin, Madison, Aug. 25-27. Dr. J. F. A. McManus, Dept. of Pathology, University of Alabama Medical Center, Birmingham,

Chairman.

GERONTOLOGICAL SOCIETY, INC., Mark Hopkins Hotel, San Francisco, Aug. 7-12. Mrs. Marjorie Adler, 660 S. Kingshighway Blvd., St. Louis 10, Administrative Secretary.

NATIONAL MEDICAL ASSOCIATION, INC., Penn-Sheraton Hotel, Pittsburgh, Aug. 8-11. Dr. John T. Givens, 1108 Church St., Norfolk, Va., Executive Secretary.

AMERICAN ROENTGEN RAY SOCIETY, Ambassador Hotel, Atlantic City, Sept. 27-30. Mr. Hugh Jones, 20 N. Wacker Dr., Chicago 6, Director, Public Relations.

AMERICAN SOCIETY OF CLINICAL PATHOLOGISTS, Palmer House, Chicago, Sept. 24-Oct. 2. Mr. Claude E. Wells, 445 Lake Shore Drive, Chicago 11, Executive Secretary.

College of American Pathologists, Palmer House, Chicago, Sept. 24-27. Dr. Arthur H. Dearing, 2115 Prudential Plaza, Chicago, Executive Director.

NATIONAL CANCER CONFERENCE, AMERICAN CANCER SOCIETY, INC.. AND THE NATIONAL CANCER INSTITUTE.

CIETY, INC., AND THE NATIONAL CANCER INSTITUTE, Minneapolis, Minnesota, Sept. 13-15. Dr. Roald M. Grant, 521 W. 57th St., New York 19, Coordinator.

HELPFUL LEA & FEBIGER BOOKS

Grollman—Pharmacology and Therapeutics

By ARTHUR GROLLMAN, Ph.D., M.D., F.A.C.P.

Lecturer in Pharmacology and Toxicology, Medical Branch; Professor and Chairman, Department of Experimental Medicine, The Southwestern Medical School, University of Texas, Dallas

4th Edition. Students who want a sound foundation for the scientific use of drugs will find it in this complete presentation. Dr. Grollman describes actions, indications, toxic effects, dosages and methods of administration of all the official drugs. Tranquilizing drugs, drugs acting on the autonomic ganglia, drug therapy of cancer, and every pharmacologic and therapeutic topic which has assumed importance in recent years are presented fully. Many parts of the book have been completely rewritten for this new edition.

New 4th Edition. 1079 Pages. 217 Illustrations, 2 in Color. 42 Tables. \$12.50

Gray's Anatomy of the Human Body

By HENRY GRAY, F.R.S.

Revised and Edited by CHARLES MAYO GOSS, M.D.

Managing Editor of Anatomical Record; Professor and Head of the Department of Anatomy, Louisiana State University, New Orleans

AMERICAN CENTENNIAL EDITION

This is one of the most thorough revisions ever made in the 100 years that *Gray's Anatomy* has been synonymous with medical teaching and practice. Here are a few of the features of the *new 27th edition*: Cardiovascular system divided into 3 parts—heart, arteries and veins; chapter on heart completely rewritten and new illustrations added; arteries of upper abdomen described more fully; section on central nervous system rewritten, simplified and further illustrated; endocrine system rewritten; new Paris nomenclature used (with few exceptions) throughout; all familiar aspects of GRAY retained.

New 27th Edition. 1458 Pages, 7" × 10". 1174 Illus., Mostly in Color. \$17.50

Merritt—A Textbook of Neurology

By H. HOUSTON MERRITT, M.D.

Professor of Neurology, Columbia University; Director of the Service of Neurology, Neurological Institute, Presbyterian Hospital, New York City

Students have become especially appreciative of this present-day application of modern neurologic principles. Dr. Merritt presents diseases of the nervous system as an integral part of internal medicine. Full consideration is given to common diseases of the nervous system and to established methods of treatment. Contains every advance in pathogenesis and treatment.

2nd Edition. 765 Pages. 182 Illustrations and 123 Tables. \$12.50

Washington Square LEA & FEBIGER

Philadelphia 6 Pennsylvania

A List of LIPPINCOTT TEXTS for 1960-61 in:-

ANATOMY OF THE HUMAN BODY

By R. D. Lockhart, M.D., G. F. Hamilton, M.B., and F. W. Fyfe, M.B. • 1st Edition • Published 1959 • 675 Pages • Over 900 Illustrations—600 in Color. \$14.75

By Arthur W. Hom, M.B. • 3rd Edition • Published 1957 • 940 Pages • 582 Figure Numbers including 8 Color Plates. \$11.00

TEXTBOOK OF THE NERVOUS SYSTEM

By H. Chandler Elliott, Ph.D. • 2nd Edition • Published 1954 • 440 Pages 158

Illustrations • Plus Atlas of 50 Plates. \$10.00

HAND ATLAS OF HUMAN ANATOMY

By Werner Spoiteholz • 8th printing 1955 • 902 Pages • 994 Illustrations, many in Color • Atlas of Roentgenograms. \$16.00

ANATOMY IN SURGERY

By Philip Thorek, M.D. • 1st Edition • Published 1951 • 970 Pages • 720 Illus trations—211 in Two or Three Colors. \$22.5

MAXILLOFACIAL ANATOMY

By Harry H. Shapiro, D.M.D. • 1st Edition • Published 1954 • 382 Page Over 400 Illustrations.

BACTERIAL AND MYCOTIC INFECTIONS OF MAN

Edited by Rene J. Dubos, Ph.D., • 3rd Edition • Published 1958 • 820 Pages • 116 Figure Numbers • 60 Tables. \$8.50

VIRAL AND RICKETTSIAL INFECTIONS OF MAN

Edited by Thomas M. Rivers, M.D., and Frank L. Horsfall, Jr., M.D., • 3rd Edition • Published 1959 • 967 Pages • 134 Figure Numbers • 41 Tables. \$8.5

HUMAN PATHOLOGY

By Howard T. Karsner, M.D., L.L.D. • 8th Edition • Published 1955 • 937 Pages • 557 Illustrations—19 in Color.

ESSENTIALS OF PHARMACOLOGY

By Frances K. Oldhum, M.D., Fremont E. Kelsey, Ph.D., and Eugene M. K. Geiling, M.D. • 3rd Edition • Published 1955 • 486 Pages • Illustrated. \$6.00

SIGNS AND SYMPTOMS

Edited by Cyril Mitchell MacBryde, M.D., • 3rd Edition • Published 1957 • 933 Pages • 191 Illustrations • 50 Tables • 6 Color Plates. \$12.00

ESSENTIALS OF DERMATOLOGY

By Norman Tobias, M.D. • 5th Edition • Published 1956 • 651 Pages • 211 Illus

MANUAL OF SKIN DISEASES

By Gordon C. Saver, M.D. • 1st Edition • Published 1959 • 269 Pages • 151 Figures—28 Color Plates. • 159.75

UROLOGY In General Practice

By Frank C. Humm, M.D., and Sidney R. Weinberg, M.D. • 1st Edition • Pub lished 1958 • 286 Pages • 259 Figures. \$6.0

ORTHOPAEDICS: Principles and Their Application

By Samuel L. Turek, M.D. • 1st Edition • Published 1959 • 815 Pages • 491 Il-lustrations—40 in Color. \$22.50

SURGERY—Principles and Practice

By J. Garrott Allen, Henry N. Harkins, Carl A. Moyer, and Jonathan E. Rhoads of 1st Edition • Published 1957 • 1495 Pages • 623 Figure Numbers. \$16.0

SURGERY OF THE AMBULATORY PATIENT

By L. Kroeer Ferguson, A.B., M.D., F.A.C.S. • 3rd Edition • Published 1955 864 Pages • 664 Illustrations. \$12.0

SURGICAL DIAGNOSIS

By Philip Thorek, M.D., • 1st Edition • Published 1956 • 320 Pages • 291 Figure Numbers. \$12.00

FLUID AND ELECTROLYTES IN PRACTICE

By Harry Statland, M.D. • 2nd Edition • Published 1957 • 225 Pages • 31 Illustrations • 5 Tables. • 56.00



East Washington Square, Phila. 5, Pa.

Anatomy

Medicine Dermatology

Urology **Orthopaedics**

Surgery

Microbiology Pathology

Pharmacology



EPITOME OF

U.S.P. and N.F.

NEW and NONOFFICIAL

DRUGS

\$3.00

\$3.35

1956

1960



but they need your help in planning their family

Delfen

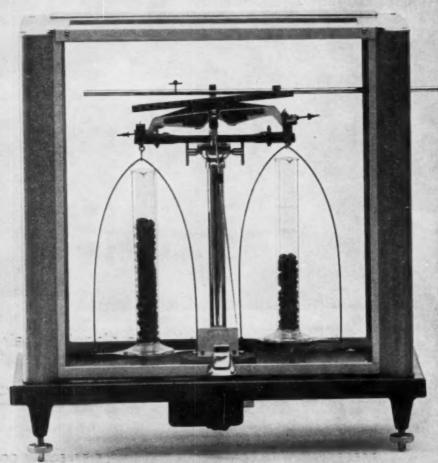
THE MODERN CHEMICAL SPERMICIDE

Precepting

THE SPERMICIDAL GEL WITH BUILT-IN BARRIER

PRESCRIBED WITH CONFIDENCE FOR SIMPLE, EFFECTIVE CONTRACEPTION

Who says multivitamins are alike?



100 Filmtab Dayalets-M on right pan of the scale, 100 sugar-coated Dayalets-M on left pan. See difference in size and weight! All Filmtab coated Abbott vitamins are similarly reduced in size. Sometimes you hear it said that there's no real difference between good multivitamin products.

Well, the formulas may read pretty much alike. But there similarity ends. At least as far as Filmtab® coated vitamins are concerned.

The Filmtab process (an Abbott exclusive) creates appreciable differences in size, weight, taste, odor, stability, solubility, and patient acceptance of Abbott vitamins.

The Filmtab coating is micro-thin and sugar-free.

Compared to sugar coatings, it cuts tablet bulk as much as a third, reduces weight as much as a half. It stands up under all tests for durability as well as (or better than) most sugar coatings. It won't chip, and it tightly seals in all vitamin taste or odor.

What's more, it gives you added assurance of potency and stability. Here's why.

Not all vitamins are compatible, especially when combined in aqueous solution. With even a trace of moisture, deterioration sets in.

But the Filmtab process is anhydrous. It eliminates the use of aqueous solutions during coating. Since the finished tablet remains essentially water-free, deterioration is materially slowed. Yet once in the stomach, the Filmtab coating dissolves *faster* than a sugar coating

Choice of formula remains your first concern, of course. But thereafter Abbott's anhydrous Filmtab coating will see to it that your patient gets the fullest possible quota of vitamin, and in a more pleasing-to-swallow way. Well worth your follow-up, Doctor.

OPTILETS® & OPTILETS-M®

Therapeutic multivitamins, or multivitamins and minerals

DAYALETS® & DAYALETS-M®

Maintenance multivitamins, or multivitamins and minerals

SUR-BEX with C

Therapeutic B-Complex and Vitamin C formula





McDowell & Wolff: HANDBOOK OF NEUROLOGICAL DIAGNOSTIC METHODS

"This manual is an outgrowth of the educational concepts of the Department of Medicine of the Cornell Medical College . . .

"Based on more than 30 years of teaching . . . I am convinced that an adequate knowledge of how to approach the problems of the nervous system can be gained by a moderate dedication of time and a sufficient and guided opportunity independently to examine patients. . . . To collect the facts of function or its disorders first and then possibly to draw inferences concerning their anatomical, physiological, and pathological significance that may ultimately lead to a formulation and a plan of therapeutic procedure, is the goal of this manual of methods."—Harold G. Wolff.

Edited by Fletcher McDowell, M.D., and Harold G. Wolff, M.D., from the Neurological and Neurosurgical Services, Second (Cornell) Division, Bellevue Hospital, New York. With 32 contributors 1960 • 193 pp., 65 figs. • \$4.50

Clear description of the various disorders . . .

Smith's PSYCHIATRY: DESCRIPTIVE AND DYNAMIC

The aim of this book is to describe concisely the various syndromes seen in psychiatric patients and to make these syndromes recognizable to student and physician alike. Rare and obscure conditions have been minimized in favor of detailed discussions of the more frequently seen disorders.

"The signs and symptoms on which the diagnosis of the various disorders rests are described; this is in keeping with ordinary medical practice in which diagnosis precedes treatment.

"Controversy, areas of theoretical discord, and non-medical speculation have been minimized. The prevailing dynamic concepts are included, as well as a brief review of their origins. Theoretical differences between the founders of the different schools of psychiatry are mentioned."—From the Preface.

By Jackson A. Smith, M.D., F.A.C.P., Clinical Director, Illinois State Psychiatric Institute, Chicago, Illinois; Former
Professor of Neurology and Psychiatry, University of Nebraska College of Medicine, Omaha, Nebraska
1960 - 350 pp. • \$7.00

Note: Teachers who would like an examination copy of either of these new texts for consideration in their teaching programs are invited to write to:



Baltimore 2, Maryland

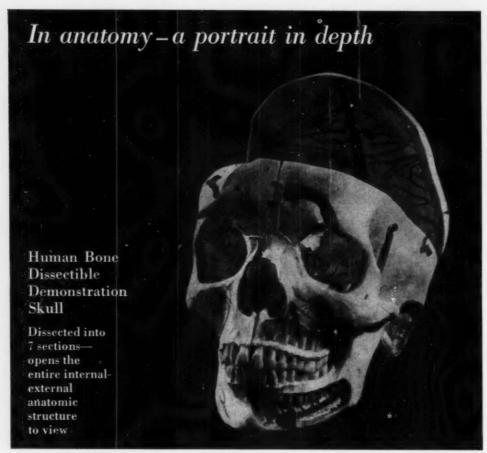


With Tampax, women can enjoy active fun ... feel as comfortable and safe as at any other time of the month.

Millions of women have used billions of Tampax. Invented by a doctor for the benefit of all women ...married or single, active or not. Proved by over 25 years of clinical study.

Tampax® internal sanitary protection is made only by Tampax Incorporated, Palmer, Mass. Samples and literature will be sent upon request to Dept. JME-50

TAMPAX SO MUCH A PART OF HER ACTIVE LIFE



Expert craftsmanship... precision... durable materials—these mark the quality of all Clay-Adams products. Choose from a vast listing of anatomical models, visual aids, dissecting kits, testing, diagnostic, and surgical supplies—more than 1,000 items all told. Each bears the stamp of meticulous care, often hand crafted to its purpose. In addition, over 10,000 Medichrome® slides bring to all the disciplines perhaps otherwise unobtainable scientific illustrations originating with leading world authorities. Whether you need a set of slides, a simple chart or a complex piece of equipment, be sure to check the well-illustrated pages of your Clay-Adams catalog for graphic information.

In medicine... trusted tools for learning and doing



Clay-Adams
New York 10, New York

AN IMPORTANT STATEMENT ON BACTERIAL SENSITIVITY TESTING WITH THE NITROFURANS

The individual nitrofurans — ALTAFUR, FURADANTIN, FUROXONE, FURACIN—are not interchangeable either in clinical application or in susceptibility testing. Although chemically related, these compounds differ to a highly significant degree in their range of antibacterial activity as well as in solubility, diffusion rate, and other physical characteristics. For this reason, Sensi-Discs* containing each of these nitrofurans are provided for appropriate disc plate testing. Results are valid only for the compound tested. Cross-interpretation will lead to erroneous conclusions.



Nitrofuran	Antibacterial Spectrum	Clinical Application	For Disc Plate Test Use
ALTAFUR® (brand of furaltadone)	Wide. Particularly effective against staphylococci, including antibiotic-resistant strains.	Systemic infections, including those of the respiratory tract and soft tissue. (Rapidly absorbed, low urinary excretion.)	ALTAFUR SENSI-DISCS*
FURADANTIN® (brand of mitrofurantoin)	Wide. Highly active against urinary tract pathogens.	Urinary tract infections. (Rapidly absorbed, high urinary excretion.)	FURADANTIN SENSI-DISCS*
FUROXONE® (brand of furazolidone)	Wide. Especially effective against enteric pathogens.	Enteric infections. (Minimal systemic absorption.)	FUROXONE SENSI-DISCS*
FURACIN® (brand of nitrofurazone)	Wide. Encompasses most surface pathogens.	Used topically only.	FURACIN SENSI-DISCS*

*Available from the Baltimore Biological Laboratory (Division of Becton, Dickinson & Co.), Baltimore 18, Md.

NITROFURANS—a unique class of antimicrobials

EATON LABORATORIES, NORWICH, NEW YORK

Dependable instrumentation is vital for thyroid function

Evaluation of thyroid function with iodine-131* requires the dependable instruments which make up this newly designed, complete

Nuclear-Chicago detection and measuring system. The DS5-1P Scintillation Detector, with its sensitive two-inch crystal and versatile collimator inserts, is ideal for regular uptakes, three dimensional depth studies, or pin-point collimation for scanning. The 132A Analyzer Computer is easy to operate, gives automatic percentage readout, and its internal spectrometer "tunes-in" only the selected and desired gamma radiation. A complete system, including the mobile stand, is surprisingly low in cost.

For thirteen years Nuclear-Chicago has been the leader in the development of high quality, reliable radioactivity instrumentation for the medical profession. We would be pleased to discuss your needs with you.



*"Diagnostic Application of Radioactive Isotopes" explains in detail the procedure for thyroid uptake study as well as eight other common radioisotope applications. Please ask us for your free copy.



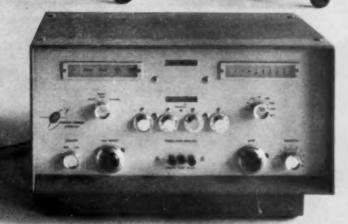
studies with radioactive iodine



COMPLETE SYSTEM WITH STAND



DS5-IP DETECTOR

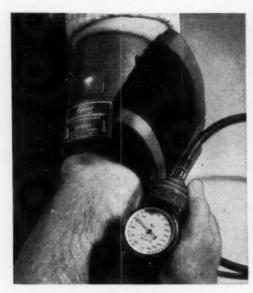


132A ANALYZER COMPUTER

THE QUALITY IS TYCOS ...

You have four possible combinations when you choose Tycos Aneroid and Cuff—so take time to select the pair that suits you best. Try both Tycos Hand and Pocket Aneroids with both Hook and Velcro Cuffs at your dealer. Taylor Instrument Companies, Rochester, New York and Toronto, Ontario.

THE CHOICE IS YOURS



Tycos Hand Model Aneroid is preferred by many doctors for house calls and office use. It is shown here with new Velcro fastener. Velcro's two nylon strips stick like a burr to a dog's coat but peel apart easily.



Tycos Pocket Model Aneroid, shown here with regular hook cuff, is recommended for routine hospital use. Just circle adult arm once, hook it and it's on. The zipper case protects the instrument, fits any pocket.

5098-V Tycos Hand Aneroid, complete with leather case

\$4950

#5082 New Velcro Cuff, less rubber bag

\$800

*5090 Tycos Pocket Aneroid, complete with leather case

\$4650

#5080 Standard Hook Cuff, less rubber bag

\$950

Taylor Instruments MEAN ACCURACY FIRST

The Journal of MEDICAL EDUCATION

VOLUME 35 · NUMBER 5 · MAY, 1960

Table of Contents

- vi Calendar of Meetings
- 385 Education for a Learned Profession-J. Douglas Brown
- 388 Medical Schools in Wartime-Stanley W. Olson and J. R. Schofield
- 398 Teaching of Quantitative Physiology-G. J. Millar and L. B. Jaques
- 404 The Internship: Factors in Choice and Level of Satisfaction-Ralph W. Heine
- 409 The Use of Experiments in Undergraduate Teaching of Pathology: Report of a Conference at Western Reserve University—Donald B. Hackel
- 416 The Placebo Effect in Medical Education-Paul J. Sanazaro
- 421 Samuel Henry Dickson (1798-1872) Joseph Ioor Waring
- 429 The Teacher in the Medical School-Martin G. Netsky
- 435 The Jacksonville Experiment in Graduate Medical Education-Max Michael, Jr.
- 440 The Honor System in United States and Canadian Medical Schools—Ralph, D. Tanz and Rose T. Tanz
- 447 Medical Education Forum
- 447 Editorial: New Challenges to Medical Education-Willard C. Rappleye
- 449 Datagrams
- 451 Reports
 - Mr. Abraham Flexner-George H. Whipple
 - The Medical School Bookstore—Alexander Greene
- 459 Abstracts from the World of Medical Education
- 463 New Books
- xxii News in Brief
- xxii News from the Medical Schools
- xxx Items of Current Interest
- xxxviii Personnel Exchange
 - xl Index to Advertisers

Officers of the Association of American Medical Colleges, 1959-1960

PRESIDENT AND COUNCIL CHAIRMAN: Thomas H. Hunter, University

PRESIDENT-ELECT: George N. Aagaard, University of Washington PAST-PRESIDENT: John McK. Mitchell, University of Pennsylvania

VICE-PRESIDENT: Donald G. Anderson, University of Rochester TREASURER: J. Murray Kinsman, University of Louisville SECRETARY: Richard H. Young, Northwestern University

EXECUTIVE COUNCIL:

Robert J. Glaser, University of Colorado, 1962 Robert C. Berson, Medical College of Alabama, 1962 John E. Deitrick, Cornell University, 1961 John F. Sheehan, Stritch School of Medicine, 1961 Stanley Olson, Baylor University, 1960 George A. Wolf, Jr., University of Vermont, 1960

baby boom-

will they all be well nourished?

As use of prepared formulas to supplement or replace breast milk increases, you will seek a formula that approximates human milk in optimal content of fats, proteins, carbohydrate, vitamins and minerals. In S-M-A you will find a formula that meets all known infant nutritional needs to promote sound health and physiologic growth—a formula on which babies thrive.

S-M-A was the first formula in which cows' milk fat was successfully replaced by fats patterned after human milk—the first to receive the "Seal of Acceptance" of the A.M.A. Council on Foods and Nutrition—the first to contain vitamins A and D—the first liquid infant formula in which ascorbic acid was successfully stabilized, thus eliminating the need for supplementary vitamin C.

S-M-A, the first infant formula successfully patterned after human milk, is constantly improved as knowledge of infant nutrition advances.

The protein and amino acid contents of S-M-A are like those of breast milk. As with breast milk fat, S-M-A fat is high in essential unsaturated fatty acids, an important factor in reducing the incidence of eczema. The physiologic sugar, lactose, the only carbohydrate in S-M-A, minimizes perianal dermatitis and aids growth of favorable lactobacilli intestinal flora. S-M-A forms a soft, flocculent curd that rivals the curd of human milk in digestibility and helps protect against colic and regurgitation.

For further information and as a helpful teaching aid, we will gladly send you our physicians' handbook, "Modern Infant Feeding." Please write to Wyeth Laboratories, P. O. Box 8299, Philadelphia 1, Pa.

INSTANT POWDER

CONCENTRATED LIQUID

S-M-A

Food Formula for Infants
Unsurpassed in Nearness to Healthy Mother's Milk



A Century of Service to Medicine

The Journal of MEDICAL EDUCATION

VOLUME 35 · NUMBER 5 · MAY, 1960

Education for a Learned Profession*

J. DOUGLAS BROWN†
Princeton University, Princeton, N.J.

It is not easy to define or delimit the boundaries of what we call "the professions." To attempt to set boundaries is to start with the wrong approach. We should seek the focus and not the fringes of the concept. Whether an occupation is a "profession" or not is determined far less by what its practitioners do than by what they are, and why they do it.

A profession is man-centered in two ways: (1) a profession demands practitioners who are free and responsible individuals and who, through their personal integrity, dedication, and courage, can be depended upon to establish and maintain their personal standards of performance; (2) a profession, no matter how technical the procedures it employs, demands that its practitioners be primarily motivated by service to their fellow men.

A learned profession is a still more demanding occupation. Two further ingredients are required: (1) a learned profession requires years of preparation of the whole man and of his knowledge and skills; (2) a learned profession requires the learning approach throughout life, as a means of fulfilling one's responsibility to one's fellow men, through the ready application of new knowledge.

A skilled craftsman may adhere to high

standards of performance and be motivated by a professional spirit of service, but his preparation may be specialized and his aim the perfection of an old skill rather than the discovery of new knowledge. A highly educated person may learn more and more about his special field but fall short of the self-imposed standards of performance and dedication to the service of others which a profession requires.

If these premises are correct, what is the best educational program for the development of a member of a learned profession? I am convinced, after thirty-five years of teaching men entering the professions and of studying high-talent manpower as my own field of research, that there is and should be two major periods in education for the learned professions. Each of these periods has the same basic pattern, but a different educational emphasis. If I were a mathematician or a musician, I would use the symbols A + B + A' + B' to represent two repeated cycles.

What are these two major periods? The first is the man-centered period of *liberal education*; the second is the subject-centered period of *professional education*. What is the parallel pattern of *both* these major periods: education in *conformity* (A), followed by education in *creativity* (B).

The significant and often neglected principle is that both major periods should have this A + B cycle of conformity-creativity if a man is to sustain his proper role as a

^{*} Presented at the 70th Annual Meeting of the Association of American Medical Colleges, Chicago, Illinois, November, 1959.

[†] Dean of the Faculty.

member of a learned profession. The fundamental reason for this lies in the nature of a learned profession, as I have sought to define it. It arises out of the man-centered quality of a profession and the learning-centered quality of a learned profession. A practitioner in such a calling must continue to grow as a man and as a student of his special field.

In the mature individual these two forms of personal development cannot be separated—they are mutually reinforcing. But in the young person preparing for a learned profession, there are fundamental reasons why the $A+B+A^{\prime}+B^{\prime}$ cycle (that is man-centered education in conformity, then creativity, and subject-centered education in conformity, then creativity) should be followed. Perhaps a brief description of the pattern, as I see it, in the education of a doctor will help make this clear.

The period of education in "conformity" starts with kindergarten and reaches into college. In this period the young person learns how to use the tools of language and mathematics and gains a knowledge of history, literature, and elementary science. This is a foundation of method and content to which the young person "conforms" rather than which he "creates." One does not "create" a new vocabulary, spelling, algebra, or the conjugation of French irregular verbs. This is primarily learning from our accumulated heritage.

The period of education in "creativity" starts as an increasing layer superimposed on education in "conformity." By the middle and upper years of college, it should be the major emphasis. It is truly liberal education in ideas, values, reasoning, judgment, imagination, and discovery in which the young person integrates knowledge into a pattern understandable to him, makes ideas his own by testing and restatement, attacks problems of interest to him, and begins to gain both intellectual humility and an intellectual want.

What are some of the great ideas of Western Civilization which one studies in liberal education—ideas which have long stirred the mind and spirit of men?

The idea of one God who is infinitely good. This is our heritage from the Old Testament and from the inspired writings of the Jewish people.

The ideal of Christian love and that each individual has infinite worth. This is our heritage from the teachings and life of Christ.

The idea of salvation, which was the great dynamic force of the medieval world and is still the persistent concern of man.

The idea of justice and that laws were made for men, all men!

The idea of political freedom to choose one's government.

The idea that economic freedom will enhance the wealth of all.

The idea that there are laws of nature that are consistent and orderly, and can be discovered.

The ideas of the mutual advantage of contract, co-operation, good manners, and sportsmanship.

The idea that beauty can be enhanced by understanding.

These are but a few of the grand ideas which we have inherited and must make our own, each one of us. From them have come thousands of corollary ideas: in religion, philosophy, the humanities, the social sciences, and the sciences.

These great ideas have come down to us because great leaders in history created and enlarged upon them, from Christ and Socrates, to Churchill and Einstein. Hundreds of names occur to one—in later centuries, for example, Milton, Newton, Coke, Blackstone, Adam Smith, Jefferson, Madison, Darwin, Lincoln, Harvey, Pasteur, John Marshall, Woodrow Wilson, Schweitzer, and many others.

To remind ourselves that bad ideas have fearful consequences, one needs but mention Louis XIV and the divine right of kings; Torquemada and the Spanish Inquisition; Hitler and racial superiority; Stalin and the supremacy of the state; and witchcraft, slavery, human sacrifice, superstition, and religious wars—a host of blots upon the history of the world.

Americans, from early childhood on, live

and learn within the framework set by the ideas passed on to us. Education is a continuous process. But it is in higher education—liberal education, most of all—that one should study this great heritage of ideas, good and bad, and make the best his own.

Liberal education is that education which gives one the fullest freedom to choose those ideas which are acceptable to one's intelligence and conscience. But one cannot choose effectively unless one understands. One cannot understand unless one reads, experiments, analyzes, and restates, preferably with the aid of someone wiser than one's self.

In this period of education in creativity, content becomes secondary to process. The aim is the development of an individual—intellectually and morally responsible, alert, and understanding. This is true liberal education. It is education for life, not for a specific profession. It is a lamp and not a ladder. If successfully attained, it will affect one's tone and attack in any profession throughout life.

Professional education, as I have seen it in operation, is again a sequence of education in conformity followed by education in creativity. A' is the period of learning from the accumulated knowledge of one's profession, whether anatomy and physiology or the law of contracts. B' should be a period of integration, self-testing, restatement, and discovery, if a learned profession is to have learning, creative leaders.

Professional education is no more terminable than liberal education for such men. Both must have their "creative" periods. The existence of the "creative" period in liberal education prepares men for the similar period in professional education. Creativity is a slant of personality. It is in the cake and not the icing!

A great learned profession, such as medicine, can discount the need for the full double cycle of liberal and professional education only at its peril. It needs education of the whole man and of his highest creative talent. It is man-centered in performance and purpose. It is moving forward rapidly in its scientific content. It must therefore emphasize the power of atlack rather than the power of retention, even though the latter remains of great importance.

In the face of accumulating knowledge and technics, there is a great temptation to take short cuts, especially at the expense of an earlier stage in education. But this is like a man who saves on his foundation so that he can build another story on his house.

The education of young people of high talent for the learned professions is one of the most critical investments that a nation can make in its future. While it is understandable that young people are impatient, those of us in higher education must weigh time against true attainment and convenience against contribution because we are the trustees of generations still to come. Speed and mass production have become persistent forces in American life. They have no place in the education for a learned profession.

Medical Schools in Wartime

STANLEY W. OLSON, M.D., and J. R. SCHOFIELD, M.D. Baylor University College of Medicine, Texas Medical Center, Houston, Texas

INTRODUCTION

The importance of developing a planned curriculum to be used in time of national emergency has been stressed by Berry, Edwards, and Kimball in their survey of medical education practices in World War II (3): "There is only one way to avoid the evils attendant on the programs thrown together under the pressures of war. Now before some future 'Pearl Harbor' is the time to formulate the way in which medical schools can best plan their programs to meet possible wartime needs."

There has been substantial thought devoted to the preparation of a wartime curriculum by various groups and committees associated with medical education. However, in spite of the continuing concern of medical educators about this problem, no generally acceptable specific solution has been formulated, largely because of the uncertainties surrounding the situation for which planning should be accomplished. Thus, fourteen years after the close of World War II, there is as yet no agreement among the medical schools as to how they can "best plan their programs to meet possible wartime needs."

REVIEW OF PLANNING ACCOMPLISHED TO DATE

I

In 1946 the Committee on Training and Supply of Doctors in the Event of Another War reported the results of the study of 68 questionnaires returned by the deans of the medical schools in the United States and Canada (3). This timely study reflects the opinions of medical educators immediately after a frustrating experience in medical education. Some of their conclusions are as follows:

 a) Selected premedical students, but not all premedical students, should be deferred from military service.

b) Premedical advisory committees of college faculties, medical school faculties, and medical school deans and not Selective Service boards and representatives of the armed forces should be responsible for selecting students to pursue premedical and medical training.

c) A ratio of two and one-half available premedical students to one selected medical student was considered desirable.

d) In war the peacetime premedical curriculum should be altered in content but not in length. The vast majority of deans favored three years of premedical training. However, a slight majority favored acceleration of the three-year curriculum by eliminating the long summer vacation periods.

e) Acceleration of the medical course was favored by approximately the same number of deans as opposed it. Comments on questionnaires indicated that many affirmative votes reflected only a patriotic desire to support established policy during a war emergency rather than any enthusiasm for a program of acceleration.

f) There was overwhelming opinion that selection of students should be a matter for the prospective student and the medical school to arrange without third-party interference by the armed forces. Of the methods used during World War II, the Navy method was found to be preferable. g) There was general agreement that the medical student should be put in a deferred category by Selective Service, but there was a division of opinion as to whether he should be in uniform and fully subsidized by the government.

h) Likewise there was strong agreement that essential faculty members be deferred but considerable opposition to the proposal for detailing medical officer faculty members to serve on active duty at the medical school.

The last two items listed above were summarized by one dean as follows: "Defer faculty and students and leave all other matters to individual schools and to the Association of American Medical Colleges."

H

The unexpected development of the Korean War five years after the close of World War II occasioned a strong burst of interest in this problem among medical educators and led to the formation of the Joint Committee on Medical Education in Time of National Emergency, a committee representing the Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association. This committee presented a comprehensive report with the following specific recommendations (6):

 To insure the continued production of well-qualified medical graduates, provision must be made for an adequate supply of premedical students.

2. The duration of premedical study should not be reduced below 90 semester hours, the equivalent of 3 academic years.

All medical students should be selected by the medical schools.

4. Subsequent to graduation and internship, deferred medical students should, if certified as available by such appropriate agencies as the National Advisory Committee on the Selection of Doctors, Dentists and Allied Specialists to the Selective Service System and the Health Resources Advisory Committee to the national Security Resources Board, be obligated to serve when needed in the Armed Forces or other special government services.

The curriculum of medical study should be reorganized to give proper emphasis to subjects of particular importance for the national health, security, and welfare in time of national emergency.

6. Medical schools should exert every effort to admit as many medical students as they can train without deterioration of the quality of medical training they can provide. Provision should be made for the increased financial support essential to the provision and maintenance of the increase in faculty, facilities and buildings required to accomplish the proposed increase in enrollments.

7. The maintenance and replenishment of adequate faculties in the medical schools are absolutely essential to the continuing production of well trained physicians to meet the needs of the civilian population and the armed forces.

8. All medical school graduates should have an internship or graduate or postgraduate training of 12 or more months' duration.

 The continuation of an active residency training program is essential to adequate professional training and medical care, even in the gravest emergency.

10. Provision for training of young men in the basic medical sciences, including graduate training, is also essential for the teaching and research functions of the medical schools and for the prosecution of research programs elsewhere. Properly qualified personnel, whether they do or do not hold a degree in medicine, should be deferred or assigned to these activities rather than to active military duty

In addition, the committee prepared a series of detailed recommendations for supplementing the medical curriculum in time of national emergency. These suggestions were published in the Journal of the American Medical Association, reprinted in pamphlet form, and distributed to the medical schools of our country (5).

After a period of approximately six months, inquiry was made regarding the extent to which these curricular suggestions had been adopted by the medical schools. The results were so disappointing that the Joint Committee appointed a subcommittee to make recommendations for implementing the teaching of appropriate matters related to military medicine and surgery

in the various medical schools. In response to this request the program known as "Medical Education for National Defense" ("MEND") was begun. This program has now grown to include 70 of the nation's medical schools (1959), with the likelihood that another ten schools will finally be included in the total. This program has been described adequately elsewhere (1, 12) and will not be elaborated upon in this review.

III

In September, 1957, the Office of Defense Mobilization scheduled a conference for the purpose of reviewing possible ways that programs of medical and dental education might be adjusted during wartime to meet the emergency needs of a nation engaged in a struggle for survival. Representatives of the Association of American Medical Colleges, the American Medical Association, and the American Dental Association met with a special committee composed of representatives of the Departments of the Army, Navy, and Air Force, the United States Public Health Service, the Veterans Administration, and the Federal Civil Defense Administration. In making plans for a carefully considered response to the above request, Dr. Ward Darley, executive director of the Association of American Medical Colleges, requested and received from the newly reorganized Office of Civil and Defense Mobilization the following set of definitions developed as a planning basis for the drafting of a National Plan for Civil Defense and Defense Mobilization:1

A. International Tension

It is assumed that periods of extreme international tension may occur. In such cases, when the President or the Congress finds that the national security demands the invocation of extraordinary authority for civil defense programs short of the declaration of a civil defense emergency, civil defense and defense mobilization measures would be accelerated.

B. Limited War

It is assumed that limited wars may occur in various parts of the world. Depending on size of forces involved, duration of hostilities, kinds of weapons used and degree of U.S. involvement, such limited wars may require degrees of mobilization of U.S. resources, production and manpower, and acceleration of U.S. nonmilitary defense as a matter of prudence.

C. General War

It is assumed, in the absence of international agreement, that weapons employed in an attack against the United States would be predominantly of multimegaton yield. The use of biological and chemical agents is possible. Delivery systems in the next few years would be predominantly manoperated with a resulting probable maximum tactical warning of initial attack of three hours for the nation as a whole; thereafter, delivery systems would be predominantly unmanned with maximum tactical warning of initial attack reduced to one half hour for the nation as a whole. At any time during this period, attack could come with no tactical warning.

Strategic warning is a possibility.

These are the officially adopted assumptions which form the basis for civilian planning to meet a national emergency. They must also be the assumptions used by the medical schools as they "plan their programs to meet wartime needs."

IV

Few individuals have written about the problem that we are discussing here. One notable exception is the paper by Casberg in 1958 on "Medical Education in Total War" (4). He makes highly pertinent suggestions regarding the status of the medical faculty in time of total war. He outlines a proposal for a Medical Manpower Advisory Committee, a national co-ordinating committee for medical education, and describes ways to reorganize a faculty disorganized by war. Finally, he makes concrete suggestions as to how bombed-out medical students and faculties might reorganize around the facili-

¹ Personal communication from Dr. Palmer Dearing, 1958.

ties of a nonmetropolitan medical school. He concludes his article with this comment:

An atomic war, contrary to the majority of current opinions, need not be decisive within a matter of days but actually may be drawn out over years. It is the responsibility of medical educators to plan for such a possibility. Planning must include consideration of both personnel and facilities, with a realistic appraisal of satellite or peripheral support. This involves the evaluation of such pertinent factors as: survey of target potentials; inventory of peripheral facilities, both basic science and clinical; assay of student and faculty resources with consideration of vulnerability from either local or national demands as well as enemy action; and coordination of these plans with relevant authorities.

Dr. Casberg's record of military service, his experience as a medical school dean, his appointment to the post of Assistant Secretary of Defense for Health and Medical Affairs, his position as Vice-President for Medical Affairs of the University of Texas, and as a surgeon who has had considerable clinical experience command the serious attention of all who are interested in these matters to his comments.

The experience of the past decade is quite convincing that the faculties of the various schools are not likely to come forward in peacetime with suggestions regarding curricular compromises during wartime.

That there exists no plan for acceleration generally acceptable to the medical schools should cause no great surprise. Every medical school is under great pressure to maintain quality in its educational offerings and at the same time keep up with the peacetime demands of a field that is expanding at an unprecedented rate. This emphasis on quality has not been achieved without great effort; for legislatures, university administrations, and even the general public have constantly to be convinced that there is no easy, cheap way to educate all the physicians that our country needs or would like to have. Therefore, any serious

effort to devise an abbreviated program for wartime needs might easily be seized upon by those who, ignoring the compromise with quality inherent in all such arrangements, would demand to know "if it can be done in wartime, why shouldn't it be done now?"

ANALYSIS OF CURRICULUM PLANS

The minimum requirement for admission to a medical college in the United States consists of three academic years (27 months) of collegiate study and includes certain selected courses. Studies show, however, that for many years over 80 per cent of all candidates admitted to these medical schools have had four years of college preparation (36 months), including an academic degree.

While the length of the medical school course is not specifically defined in the official statement of the Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association for an approved medical school, it is clearly implied that there shall be four academic years of a graded curriculum (approximately months of instruction). Many of the licensing boards of the several states specify that acceptable candidates shall have successfully completed not less than four terms of eight months each in an approved school of medicine.

In World War II the demand for manpower, particularly among those in the ages at which students normally enter college and medical school, was so great that immediate steps were taken to eliminate the long summer vacation periods between each of the regular collegiate and medical school academic terms. This resulted in the process familiarly known as "acceleration." No effort was made to lower the total length of the medical school instructional period below four terms of nine months each (i.e., 36 months), but the premedical instructional period was limited by Selective Service to 24 months. This frequently resulted in failure of termination of premedical studies to coincide with the commencement of medical school instruction. Furthermore, the acceleration of the medical school curriculum forced the adoption of a nine-month internship period (over the strong protest of medical educators), in order to avoid having two classes of interns in the hospital for overlapping periods of three to six months.

As one looks at the problem of scheduling medical school classes in terms of the possible permutations that can be developed from a 36-month schedule, the following are the theoretically reasonable possibilities:

Plan 1. There could be 12 terms of three months each, or

Plan 2. Six terms of six months each, or Plan 3. Four terms of nine months each (World War II accelerated schedule), or

Plan 4. Three terms of approximately 12 months.

T

The schedule now in use in the medical school of the University of Tennessee (2) is essentially one of 12 terms of three months each (Plan 1):

Fifty students are admitted each quarter. Quarters begin in January, March, July and September. Students entering the first quarter may go through six quarters without interruption. They are then required to drop out for one quarter and prepare themselves for the Comprehensive Examination which covers the work of the first six quarters. A passing grade is required on this examination before the student may enter the seventh quarter. He then may attend classes without interruption until he is graduated. There is a two-week vacation at Christmas and a four-week vacation in June and July. With this program a student may graduate in a little over three years.

П

Plan 2 apparently has never been adopted in this country either in peacetime or in wartime, but is currently used in the Swedish medical schools which admit a new class each 6 months. A study of the possibilities inherent in this plan suggests that it might have certain advantages such as the following:

1. It would permit the acceptance of classes at regularly recurring periods, that is, July 1 and January 1 of each year.

2. It would permit a maximum use of basic science laboratory facilities, since most of the major laboratory courses could be completed in a single six-month period.

3. It has interesting possibilities for the scheduling of clinical clerkships, which might be substantially superior to the system now in use in many medical schools.

4. It would permit the continuance of the standard 12-month internship without creating a conflict in the phasing of schedules (i.e., a new class each six months).

Ш

Of all the plans, No. 3 (the system adopted during World War II) is the simplest to accomplish, since it merely eliminates the long vacation period, but it is perhaps the most awkward to maintain because it results in the commencement of instruction at different times each year, and in certain years the commencement of instruction begins two times within the same year.

Viewed simply as a plan to produce physicians more quickly during wartime, this plan has much to commend it.

Advantages.—It eliminates long vacation periods, which are scarcely justifiable in wartime. It produces a class of physicians in three years instead of four. By taking a full class of students each nine months, it produces an extra class of physicians every fourth year.

Disadvantages.—There are certain disadvantages inherent in the plan. There are other disadvantages not inherent but the result of concomitant decisions which, if altered, might have avoided these disadvantages.

Inherent disadvantages.—The assumption is made that, no matter what is ordinarily accomplished by the faculty during the long summer vacation period, the time could better be spent during wartime in educating

physicians at a faster rate. It is not true, of course, that medical teachers as a group take a three-month vacation for recreation. For many, this is a very productive period in the research laboratory. Others use the time to prepare publications, revise lecture outlines or laboratory manuals, and work on a host of other things that seem not to be possible of accomplishment during the regular school year. Elimination of this period places an added load on the faculty. Scheduling of one-third more students in a calendar year is a further load upon the faculty.

The adoption of this curriculum virtually demands the adoption also of an internship of nine months' duration. Failure to do so results in overlapping of the new class of interns with the old for three- to six-month periods and a consequent disruption of the

normal delegation of duties.

Experienced disadvantages that are not inherent in the plan.-During World War II substantial difficulty was occasioned by the decision to induct medical students into military service, assign them to a medical school, and provide military supervision and discipline by military personnel.

The reasons for the adoption of such policies by the military seem clear. As Col. Francis Fitts has pointed out,2 failure to give medical students military status and to assign them to a medical school during World War I resulted in the voluntary enlistment of large numbers of medical students who promptly went off to war as combat soldiers. As a result, the postwar classes (1919-22) graduated a substantially smaller number of physicians than usual. Those students who remained in medical school were regarded by some as slackers -an invidious characterization that few patriotic young men could tolerate.

The experience of World War II demonstrated that, while the assignment of enlisted persons to medical schools prevented the students from volunteering for combat duty, it failed in many respects to protect

² Personal communication from Col. Francis Fitts, 1957.

the student from the unkind criticism of those whose sons were serving at battle stations. The students who were determined to see combat duty found an easy, if not completely respectable, method for doing so-simply failing the medical course. The quality of military supervision in the medical schools was not always of the highest, and frequently military orders conflicted with arrangements established by the medical college authorities for vacation breaks, etc. It has been properly said, "A man cannot serve two masters"; the very presence of military authority on campus was a serious distraction to the educational process and was often destructive to the climate of learning.

None of the medical school deans approved the procedures used for selecting medical students late in the war. However, the Navy method was more highly regarded by the medical college faculties than the Army's inflexible method of assignment (3).

There was substantial opposition by the schools to the policy established by the military for the payment of tuition, purchase of books and equipment, and allocation of a quarters and ration allowance, together with provision of basic enlisted man's pay to the students attending medical school. These subsidies were established without respect to the student's ability to pay his own tuition or provide for his personal needs.

Thus, in assessing the accelerated program, care should be taken to distinguish the inherent defects from the extraneous ones imposed by the military organizations and the Selective Service System. A dean who had personal experience with those difficulties summed up the matter thus:

Many of the losses in the quality of medical training during the past war would have been avoided if greater autonomy were granted to our universities and professional schools. We know how well the exercise of such authority worked in England and Canada under such circumstances. Planning and execution would be in the hands of those thoroughly acquainted with the teaching problems involved rather than in the hands of the military.

A variation of the World War II accelerated plan was that adopted by the University of Utah upon cessation of hostilities and continued for a period of about 4 years.3 Under this arrangement one class of students was accepted each summer, but after only a short vacation period between each of the academic years the students proceeded with their studies on an accelerated schedule which permitted completion of the medical course in three calendar years. The faculty for the first year had a free quarter in the spring, that for the second year a free quarter in the winter, and the clinical faculty found free time in the fall and summer.

This program was discontinued for reasons relating to the desire of students for a longer vacation for social and financial reasons. It has the obvious advantage of producing a physician graduate in three years instead of four, but it does *not* produce an extra class of students each four years.

IV

Recently, there has been considerable discussion by the faculties of several medical schools, but particularly by the Johns Hopkins School of Medicine (11), of the possibility of a schedule involving three academic terms of approximately 12 months each, with the inclusion of a 12-month internship in the fourth year. Under this arrangement the internship, as well as the usual instructional program, would be under the supervision of the medical school. This has most of the advantages of plans 1 and 2 but avoids some of the disadvantages inherent in those plans.

Many medical schools have responsibility for the education of students in other disciplines related to medicine. This restricts sharply the flexibility of curricular planning and schedule preparation enjoyed by those few schools which teach only medical students. Obviously, the develop-

ment of a satisfactory national plan must take into account all the obligations of our medical schools.

PLANNING FOR THE FUTURE

The biggest obstacle to planning for an extensive general war which might result in the destruction of many of our metropolitan areas is the difficulty of knowing where to begin and how to proceed. The problem is so enormous that it seems to defy a rational solution, and consequently most individuals are repelled in their efforts to achieve such a solution. This is the essence also of the difficulty encountered in the development of medical plans for the care and treatment of civilians injured by enemy attack.

I. Total War

Total war is the most serious threat to survival of the country and is the condition for which a truly effective accelerated plan of medical education would be most desirable and most necessary. Such a plan, of course, is not possible of complete development at this time, but efforts should by all means be made to solve at least part of the attendant problems, since any solution, however small, would be superior to no solution at all.

Suggestions for carrying on medical education during total war include (1) the maximum utilization of medical schools in non-metropolitan areas, (2) the utilization of Veterans Administration hospitals in non-metropolitan areas, and (3) the doubling-up in the use of facilities of medical schools in metropolitan areas not damaged by enemy attack. The key to these proposals appears to be the availability of basic equipment which would not be readily procurable following the onset of hostilities. This means the adoption of a stockpiling program.

The difficulties encountered in developing a stockpile of teaching materials are great, and, unless some preliminary studies could actually be carried out, it is not likely that our government will be persuaded to make such a costly investment. There has been some discussion in the MEND Committee

³ Personal communication from Dr. Richard H. Young, former Dean at Univ. of Utah, 1959.

of the possibility of carrying out a field test of medical instruction in an adapted facility with selected faculty members and selected entering medical students during the period just immediately preceding admission to medical school, to determine what essential teaching materials and equipment might be needed. To date this suggestion has not been implemented.

II. International Tension

Preparation for the condition described as "international tension" is the situation for which there is greatest immediate justification, inasmuch as we are living constantly with such tension at the present time. A natural desire to avoid unpleasant adjustments unless absolutely necessary acts as an effective deterrent to intensive planning for a wartime situation, even though sound judgment dictates that such planning should be made. But, since it is characteristic of the cold war that there will continue to be fluctuation in the degree of tension, we will probably continue to justify our failure to plan properly by pointing to the recurring improvement in the world situation, ignoring conveniently the corresponding deterioration in the intervals between such welcome periods of released tension.

Should there be prolonged and unremitting difficulty, our country may be forced to make the kind of sustained effort that would require total mobilization. The peril to which we would be willing to respond by adopting total mobilization would, of course, be a very real one, else we could scarcely expect those engaged in business and industry and in the professions to forego their cherished privileges of personal freedom. Clearly, under such circumstances many of the problems which plagued the schools during World War II, during which time only partial mobilization was invoked would be nonexistent. First among these would be the fact that there would probably be no great manpower shortage such as was occasioned by the need to train and transport a huge expeditionary force. Hence, faculty members might not be needed in the military forces in as great numbers as in World War II; and it might be quite possible to institute a system of rotation to permit the faculty to serve on active duty for limited periods; hospitals and medical schools probably would not be called upon to form general military hospitals out of their staffs; and the medical needs of the civilian group actively participating in civil defense preparations would enjoy a priority much higher than in World War II. Since the urban civilian in World War III probably will be more vulnerable to enemy nuclear air attack than the military, those who remain to participate in civil defense activities may experience greater danger than servicemen located in a traditional front line of contact with the enemy.

Total mobilization would make available the services of women, many of whom are now engaged in home-making activities. The experience of countries such as Russia, Poland, China, and other totalitarian states suggests that women can occupy a major role in the provision of medical services.

Total mobilization would accelerate the development of civil defense planning, and medicine would undoubtedly share in this increased emphasis. Medical school faculties and medical students, as demonstrated by the limited experience of the MEND program, would be very useful and very effecttive in organizing the medical-care aspects of a civil defense program (7, 8, 9, 13). Obviously, this would have to be done as an adjunct to the educational objectives of the medical school, but, since it would be an important and essential activity under total mobilization, it would help to provide patriotic status to those so engaged. This is in distinct contrast to the situation existing during World War II, when medical education activities appeared to have intellectual justification but relatively little emotional justification in the view of the average citizen. If a medical school were an important factor in preparing for his (the citizen's) welfare and that of his family, he would be inclined to respect the role played

by the medical school, its faculty, and its students.

The medical school would, however, be faced with the necessity for defending the essential aspects of the medical curriculum and for resisting unwarranted efforts to accelerate beyond a level consistent with the education of competent physicians. Of the various programs suggested as theoretically possible, the one which appears to have the greatest merit for this specific situation is the one which would provide a 48-month curriculum, during which time medical schools would be required to give educational experience up to and including the internship program.

The matter of residency training is one to which considerable thought and attention should be given. It is likely, however, that military residency training programs and Veterans Administration training programs as well as civilian residency programs under total mobilization would all be functioning to full capacity and engaged in supplementary civil defense activities, because here, too, the problem would not be one of manpower shortage but rather one of combining educational activities with local civil defense responsibilities.

Graduate education in the basic medical sciences must be preserved along with the programs of research and creative teaching which will make possible the production of faculty personnel for the future. World War II rules of Selective Service effectively aborted nearly a decade of prospective graduate students, an irrevocable loss of scientists now being felt very keenly by all faculties some 16–18 years after such rules were put into effect.

III. Limited War

The condition described as "limited war" might require lesser mobilization than for that described as "international tension." There has been one such experience since World War II (i.e., the Korean engagement). It would undoubtedly create many of the problems related to premedical education, interruption of residency training pro-

grams, and interference with graduate education, as experienced during the years 1950 through 1955. The number and intensity of these problems would be related to the scope and duration of the limited war and the size of the expeditionary forces. It is doubtful that the size of such expeditionary forces will ever reach the proportion achieved during World War II. Thus planning should be directed toward modification of the inequities encountered during the Korean engagement. This planning can probably best be accomplished by consultation with such national advisory groups as the National Advisory Committee to the Office of Civilian and Defense Mobilization or their successor organizations.

THE ROLE OF EDUCATION IN NATIONAL PLANNING

In the past, wars have been won largely by accumulating manpower and resources to produce striking power greater than that of the enemy. It is likely that the long-term race for superiority among nations will in the future have more to do with educational and intellectual accomplishments than those related to physical brawn.

It appears that this philosophy has already begun to be adopted in our country. Our citizens, who in the past have complacently accepted the premise that our educational system had no equal and that we needed to make no greater efforts in this direction than were already being made, were badly shaken by the achievements of Soviet Russia in the field of guided missiles and the development of nuclear weapons. Now the educational process is being reexamined everywhere. It will take time for education as a national resource to achieve the role which it apparently occupies in the thinking and planning of totalitarian countries. It may take even longer for it to affect basic decisions with respect to the defense of our country. But this process has already begun, as clearly shown by adoption of the National Education for Defense Act; and, if this process continues in succeeding years, one may safely assume that educational institutions will have a greater voice in determining policy during wartime than they have had in the past. They will also have correspondingly greater responsibility for producing trained persons who can contribute significantly to the defense of our country (10).

The main conclusion to be drawn from this change in the national perspective is that, as we plan for future wartime emergencies, we should not attempt only to defend ourselves against a repetition of the educationally unsound policies forced upon medical schools during World War II. Instead, we should strengthen our educational potential so as to be able to make the maximum contribution to the present and future welfare of our nation and then clearly define the proper role of the medical schools in developing comprehensive plans for national defense.

REFERENCES

- 1. Annual Reports of Coordinators, MEND Program, 1955–56, 1956–57, 1957–58. (Copies not in formal literature but distributed to all medical deans and on file at the Association of American Medical Colleges.)
- Association of American Medical Col-Leges. Admission Requirements of American Medical Colleges, 1958–1959, p. 164.
- 3. Berry, G. P.; Edwards, D. J.; and Kim-Ball, S. Report of the Committee on Training and Supply of Doctors in the Event of Another War. J. A. Am. M. Coll., 22:65– 76, 1947.

- CASBERG, M. A. Medical Education in Total War. Am. J. Surg., 95:493-504, 1958.
- 5. SUBCOMMITTEE ON CURRICULUM (S. W. OLSON, CHAIRMAN) OF JOINT COMMITTEE ON MEDICAL EDUCATION IN TIME OF NATIONAL EMERGENCY. Suggestions for Supplementing the Medical Curriculum in Time of National Emergency. J.A.M.A., 145:1288-89, 1951.
- Report of the Joint Committee on Medical Education in Time of National Emergency (STOCKTON KIMBALL, chairman) Representing the Association of American Medical Colleges and the Council on Medical Education and Hospitals of the American Medical Association. J.A.M.A., 144:1111-15, 1950.
- Editorial, How to Meet an Emergency. J.A.M.A., 164:876, 889-90, 1957.
- HAMPTON, J. K., JR. Operation AFTA. J.A.M.A., 169:378-80, 1959.
- HOWARD, J. M.; BUTLER, D. B.; OLSON, S. W.; and SCHOFIELD, J. R. Mobile Medical Support for Civil Defense. 2. Treatment of Mass Casualties. J.A.M.A., 160:1211-14, 1956.
- LYONS, G. M., and MASLAND, J. W. Education and Military Leadership: A Study of the R.O.T.C. Princeton, N.J.: Princeton University Press, 1959.
- New 5-year Curriculum Approved. Under the Dome: Johns Hopkins Medical Institution, Vol. 7, No. 3, 1958.
- Olson, S. W. Medical Education for National Defense. J. M. Educ., 29:15-22, 1954.
- Olson, S. W.; Schoffeld, J. R.; Howard, J. M.; and Shearer, T. P. Medical Support for Civil Defense. 1. Field Trial. J.A.M.A., 160:1202-5, 1956.

Teaching of Quantitative Physiology

G. J. MILLAR* and L. B. JAQUES*
College of Medicine, University of Saskatchewan, Saskatoon, Saskatchewan

During the past six years the authors have been conducting a course in physiology for first-year medical students along rather unusual lines. As we have had requests for descriptions of this course from various interested teachers, we are pleased to present in summary fashion the main points of this

program and the results obtained.

Since many of the difficulties in laboratory teaching of physiology are similar to, but more complex than, those of physics, it occurred to us that there might be some advantage in making use of the teaching methods of this subject. For a number of years we had discussed the possibility of improving the teaching of physiology by the inclusion of problem work-a common method of teaching physics. With the large amount of material that it is necessary to cover in a first course of physiology for medical students, however, this seemed an impossible task until in 1953 we examined the background of our students. We had proceeded on the assumption that our students were completely ignorant of the working vocabulary of physiology and the medical sciences. When we undertook actual testing of students in the first ten days of their course, it was found that our students had an extensive working vocabulary for physiology, due to the extensive programming of physiological material in health courses of the primary and secondary schools of our province (2). When time is no longer needed to give vocabulary material, it is possible to devote a considerable portion of the stu-

* Dr. G. J. Millar is Professor of Physiology, and Dr. L. B. Jaques is Professor and Head of the Department of Physiology and Pharmacology, University of Saskatchewan, Saskatoon, Saskatchewan. dent's time to a more intellectual pursuit, namely, the solving of problems.

The following program has been developed for this purpose. Each week a lecture is given on the theoretical and mathematical aspects of the techniques used, and a set of three or four questions is issued to the students at the end of the lecture. These are to be worked out and the answers returned within the week. In the course of a year some 50–60 problems are used. An attempt is made to change the problems from year to year.

The essential requirement of the course is that it is quantitative. Premedical training in biology is necessarily descriptive in nature, and the physiology taught in elementary and high schools consists essentially of pretty pictures. The pictures themselves and the explanations of them are often erroneous. It comes as a complete surprise and a most worth-while challenge to the intellectual curiosity of the student to be required to transpose these into actual working models to answer quantitative problems. We therefore feel that, fundamentally, this is a course in quantitative biology. We point out to students that, while descriptive biology is necessary for background, to appreciate medical problems these must be particularized to the patient and this in turn requires quantitative concepts. However, as this is an area of biology, the concepts of normal frequency distribution, the representation of a distribution and its limits, the definition of what is abnormal (statistically versus functionally), all become important. As a result, an essential part of the course is the use of statistical methods, but it is emphasized to the students that this is not a course in statistics. It is an attempt to master certain biological principles and their mathematical expression essential to the study and practice of medicine. In the process, students become exposed to graphs and to such terms as "mean," "standard deviation," "significance," "correlation."

Certain parts of physiology lend themselves much more readily to this approach than do others. For example, it is difficult but not impossible to provide arithmetical problems on the nervous system. In the case of those parts of the subject which do not lend themselves well to algorism, essays are assigned to balance out the program. As this is introduced only after some weeks of quantitative problems, there is a satisfactory carry-over of the basic principles. The essays also encourage use of the library and "reading with the understanding," and students welcome them as focal points about which their studies can be centered.

The following examples represent the types of problem presented to the student. Questions 1, 2, 3, and 4 acquaint the students with biological distributions and criteria of significance. Questions such as 5 acquaint the student with properties of the cell and some of the principles of general physiology; 6, 7, and 8 with biophysics; and 9–15 give practice in handling physiological data involved in system physiology.

- 1. The following table shows the results of a survey of red blood cell counts in college men (r.b.c. counts are expressed as millions of cells per cubic millimeter). The normal r.b.c. count in men is about 5 million cells per cu. mm. Tabulate these data in appropriate class intervals and determine the frequency of the values occurring in each class. Make a histogram from the frequencies, using suitable scales.
- 2. The following figures represent the oxygen capacity of the blood of 60 diabetic patients. Calculate the mean, standard deviation, and standard error for this group. (This statement was followed by the necessary data. The problem was solved by a standard technique, using grouped data.)
- 3. The table below shows the incidence of

bronchial tuberculosis found on examining the lungs of certain types of patient at autopsy.

	No. of specimens examined	No. of TB cases found
British TB Association	94	89
Author	31	25

Author A claimed that his findings were very similar to the findings of the British TB Association. Would you agree with Author A?

- 4. A recent research report describes "Studies on Acclimatization and on the Effect of Ascorbic Acid (Vitamin C) in Men Exposed to Cold." Changes were observed in the volume of urine excreted and in the water intake during exposure to cold. The values below represent the mean daily water intake of the 6 subjects who received vitamin C supplements in their diet during the 11-day interval in a cold environment.
 - a) Plot the data (daily water intake versus time).
 - b) Assuming a linear relationship between water intake and time, calculate the equation of the regression line for the data. Draw this line on your plot.
 - c) Calculate the coefficient of correlation.
 - d) Determine the significance of the coefficient of correlation and describe the meaning of the value you obtain.
- (Required data supplied in tabular form.)

 5. A solution of the potassium salt of the protein insulin (Compartment A) is separated by a membrane from a solution of potassium sulfate (Compartment B). Assume that the pH is such that the protein has a net charge of 5, that this charge is just neutralized, initially, by the potassium ion present in Compartment A and that the concentration in Compartment A is 0.01 m with respect to the protein. The solution in compartment B is 0.1 m and is completely ionized. The membrane is not permeable to protein ions but is permeable to potassium and sulfate ions.
 - a) Calculate the concentrations of ions on each side of the membrane when the system has reached equilibrium, assuming that no water passes across the membrane.
 - b) What will be the osmotic pressure differ-

- ence across the membrane under the conditions described in a?
- c) In which direction will water tend to move?
- d) If the initial volume of each solution is 1 liter, what will be their final volumes when osmotic equilibrium has been established?
- 6. By flexion of the elbow some subjects can lift a 143-kg. weight 10 cm. in 1 second. What is the power generated by the biceps muscle?
- 7. a) What class of lever system does the elbow joint represent?
 - b) After making the appropriate measurements of your own arm, calculate the tension on the tendon of the biceps muscle if you raise a weight of 25 lbs. one inch.
 - (i) When the biceps makes an angle of 90° to the radius.
 - (ii) When the biceps makes an angle of 135° to the radius,
- The diameter of a circle subtends an angle of 1 minute at the eye of an observer who is 20 feet away.
 - a) Calculate the size of the circle.
 - b) Compare the calculated diameter with the width of the lines that form the letters on the Snellen chart.
 - c) Calculate the diameter of the geometrical image of the above object. The distance between the retina and nodal point of the eye is 15 mm.
 - d) Compare the size of this image with the diameter of a cone in the fovea.
- A sample of arterial blood was found to contain 1.84 ml. of oxygen (measured at S.T.P.) when the blood was saturated and 5.4 × 10⁶ red cells/mm³. On centrifuging, the sample was found to consist of 3.83 ml. packed red cells and 5.07 ml. plasma.
 - a) What was the average volume of a red cell in the sample?
 - b) What was the average amount of hemoglobin per red cell?
 - (Note: 1.34 ml. O₂ [S.T.P.] combines with 1 gm. of hemoglobin).
- 10. 10 ml, of a 1 per cent solution of Evan's blue dye was injected into the vein of a subject. The plasma of a blood sample drawn 6 minutes later had a dye concentration of 0.04 mg/ml. The dye concentration of a second sample of plasma drawn 14 minutes after the injection was 0.028 mg/ml. The hemato-

- crit value for this subject was 47 per cent before correction for the volume of plasma trapped with the red cells. Calculate
- a) The total plasma volume.
- b) The total blood volume.
- c) The total red cell volume.
- d) Why is the calculated value for red cell volume erroneously high?
- 11. a) What is considered to be the normal hemoglobin concentration of human blood? Compare values in all the textbooks you can consult.
 - b) The blood of a patient contains 4.2 million red cells/mm³, and the hemoglobin concentration is 13.8° gm. %. Calculate the color index of this blood.
 - Would the color index of blood be abnormally high, low, or normal
 - 1. Immediately after hemorrhage? Why?
 - 2. In a patient with anemia due to iron deficiency? Why?
- 12. The data supplied are values of percentage oxygen saturation of a subject's blood after it had been equilibrated at 37° C. with gas mixtures containing oxygen and carbon dioxide at the partial pressures indicated. The blood contains 14.93 gm. % hemoglobin.
 - a) Plot the data.
 - b) What will be the oxygen capacity of this blood?
 - c) What will be the oxygen content in volumes % of arterial blood when the alveolar P_{O2} = 104 mm. Hg and alveolar P_{CO2} = 40 mm. Hg?
 - d) What will be the oxygen content of mixed venous blood if the average tissue P_{O2} = 40 mm. Hg and P_{CO2} = 47 mm. Hg?
 - e) What will be the arteriovenous difference?
 - f) Under the conditions of c and d, what volume of oxygen will be used by the tissues per minute if the heart ejects 7.5 liters of blood into the aorta per minute? (Data were supplied by which the student could plot two oxygen dissociation curves at carbon dioxide partial pressures of 40 and 47 mm. Hg.)
- The following data were obtained from a male subject during exercise on a bicycle ergometer.

Hemoglobin—15.8 gm. %

O2 saturation of arterial blood—98%

R.Q.-1.2

Body surface area-1.8 sq. m.

Pulse-115/min.

Respiratory ventilation rate—27.5 l/min.

Cardiac index-8.89 1/min/sq. m.

O2 consumption-1,400 ml/min.

Alveolar PCO: -42 mm. Hg.

Calculated P_{COi}—of mixed venous blood —58 mm. Hg.

Calculate the following:

- a) Cardiac output.
- b) O2 capacity of blood.
- c) Mean stroke volume of the heart.
- d) Oxygen arterio-mixed venous difference.
- e) Carbon dioxide arterio-mixed venous difference.
- f) Oxygen content of arterial blood.
- g) Percentage O₂ saturation of mixed venous blood.
- h) Amount of hemoglobin that might be considered to be in the "reduced" form in mixed venous blood.
- i) Rate of carbon dioxide elimination.
- j) Discuss the possibility of cyanosis in this subject
- 14. A patient is placed on anticoagulant therapy, and you are to administer heparin to him. You are provided with bottles of heparin solution labeled "Heparin in isotonic saline; 10 cc.; 1,000 units/cc." The patient is to receive an initial dose of 20,000 units, followed by a continuous infusion into a vein, by which he will receive 2,000 units/hour. The rate of infusion should be about 20 drops/min.
 - a) How much would you administer as an initial dose?
 - b) What should be the concentration of the infusion fluid? (Volume of one drop approximately 0.04 ml.)
- 15. Renal function tests were performed on a patient and the following data were collected:

Inulin content of plasma50 mg. %
Inulin content of urine 6.25 gm. %
Glucose content of plasma 400,0 mg. %
Glucose content of urine120.0 mg/ml
Diodone content of plasma5 mg. %
Diodone content of urine 3.5 gm. %
Rate of urine flow 1.25 ml/min

Calculate

- a) The glomerular filtration rate
- b) The amount of water reabsorbed from each ml. of glomerular filtrate
- c) The renal plasma flow
- d) The glucose T_m ,

- e) The filtration fraction
- f) Is there, or is there not, reason to be concerned about the functional state of the kidneys of this patient?

Complementary to the program has been a tutorial system which was instituted at the same time and has continued. Each student has 20–30 minutes a fortnight with a senior member of the department. The student's reports from both the experimental laboratory and the problems are discussed with him. Mistakes are pointed out, and principles are discussed and elucidated. This is a most useful period.

During the current year an alternative method of handling the problems has been introduced. Instead of the problems being assigned for solution at home, a 3-hour laboratory period is held each week, during which time the problems are assigned and solved. An instructor is present to give a preliminary talk and to advise and assist students in the solution of their problems. This means that a definite set time is given to the problems rather than very prolonged periods of time that may be required at home. By having immediate help available, the slower students get maximum value out of the course. It is too early, at time of writing, to assess the value of this innovation, but, on the basis of the students' comments and attitudes, we believe this technique is

We have been impressed by the positive results of this program. After the students have completed the course, we have found that they are able to read scientific papers and to make use, in a simple way, of the criteria of significance, so that they seem to have acquired some critical standards with which to judge the reliability and accuracy of the published paper, etc. We have received good reports from the clinical teachers on the preparation of our students. They have shown an ability to think for themselves and to evaluate the reliability of data presented to them. This has not led to embarrassment of clinical teachers through their being challenged on the reliability of their statements. This is probably due to this type of training, resulting in a more mature approach to the evaluation of evidence.

We have found that remedial measures are more satisfactory with the "problem approach." For those students who failed the examination and were required to spend a summer's work on the course to prepare for a supplemental examination, a most salutary effect was observed on their appreciation of the value of the course and the value of physiology for their own professional future. As students in successive years remarked, "I hate to admit it, but I'm glad you gave me this supp. I enjoyed studying this summer" . . . "If it weren't for the problems, I'm sure I wouldn't understand the physiology as well" . . . "I thought I knew all about oxygen transport in the blood until I tried to do the problems. Then I found I had to go back to the book some more. I don't think you can catch me now" ... "I'm looking forward to next year and I think I'm going to have a good one," From the first, our students have referred to the content of their lectures as "theoretical physiology," and they look upon the solving of problems as a complementary form of study which proves and tests their knowledge of the "theory." The student who studies by himself during the summer to prepare for a supplemental examination in the autumn has at his disposal a testing program by which he can judge his progress. As a consequence, he faces his autumnal trial, very often, with exuberant confidence. We have not found this response with poor students taking a supplemental examination in the usual type of course in physiology based simply on the learning of information.

Every system of teaching reveals its own particular set of difficulties. In our system there is a limited number of type problems that can be asked. The problems are changed from year to year, but a pattern has developed of which students have become aware. As with any program involving assignments, the poorer students tend to copy the reports of the better students, with a

resulting further decrease in the value of the course to them. The present system which involves a "problem lab" does much to circumvent this defect.

The two major problems for the staff are (i) the ingenuity required in devising suitable problems and (ii) the lack of wide appreciation of the nature of tutorial teaching, which is necessary if the full value of problem-solving at the level of physiology is to be obtained. Members of the department involved in the course must be continually alert in their reading for ideas and data which can provide material for problems. Much must be rejected as unsuitable, but there are dividends in the fresh approach to physiological and medical literature. Problem-solving is, in essence, a form of the Socratic method of teaching. For maximum value, it needs to be followed by a series of questions in the Socratic manner, and hence the need for personal tutorials. Gilbert Highet (1) has pointed out the criticisms of this type of teaching. The good tutor is he who draws the ideas out of the student, not pumps them in. However, students tend to judge teachers by their display of knowledge rather than by how much the teacher has led the student to think through the problem. As deans and others judge teachers on their reputation for displaying erudition, this can be a handicap for the teacher. As with other types of tutorial teaching, a larger teacher-student ratio is required.

With any new approach to a subject, the response on the part of the teacher is of great importance, and this in turn is reflected in the students. This factor is so great that we believe no opinion can be given on a changed approach until after five years' use and after testing by more than one teacher. The program has been in operation for six years. Eight members of the department have participated in the teaching during this period, with one of us (G. J. Millar) having the chief responsibility. There has been no loss of interest on the part of teachers in the program, and each year's group of students

seems to have responded well. There has been, of course, the normal variability in response that one finds from class to class. One factor in our favor has been our relatively small classes (30–40 students). This allows for more personal contact between student and teacher than is possible in a larger school. On the other hand, we believe a problem program can operate very

well with large classes, especially when a "problem lab" is used.

REFERENCES

- Highet, G. The Art of Teaching. New York: Vintage Books, 1957.
- MILLAR, G. J. Health Education in Alberta Schools. Submission to the Royal Commission on Education in Alberta, 1958.

The Internship: Factors in Choice and Level of Satisfaction

RALPH W. HEINE, Ph.D.* University of Chicago School of Medicine, Chicago, Illinois

On two successive years (1958 and 1959) the Senior class at the University of Chicago School of Medicine and the interns at Albert Merritt Billings Hospital, the associated teaching hospital, were invited to respond (anonymously) to a questionnaire dealing with factors related to choice of an internship. The inquiry, undertaken as part of a broad program aimed at improving internship training, also sought information on preferred modes of instruction and included general questions regarding the place of the

internship in medical training.

Since the Senior respondents were limited to one school (the University of Chicago), the extent to which these findings can be generalized is open to question. However, the extremely high correlation between the attitudes of the Seniors and those of the interns who came from medical schools in every part of the country suggests that the opinions obtained in this study may be widely held. It might also be observed that the Seniors themselves are an extremely heterogeneous group with respect to the schools in which they took premedical training and in regard to geographical localities in which they intend to practice. These factors would have the tendency of further reducing bias associated with parochial interests and specialized local conditions of practice. The selective factor that probably most limits the degree to which findings can be generalized is the level of aspiration of the members of the sample. The findings may

be more representative of attitudes of students oriented toward specialized practice than of students planning to enter general practice.

The questions were developed on the basis of information obtained in a number of unstructured interviews with Senior students and interns. In its final form the questionnaire directed each respondent to rank in terms of acceptability a number of alternative statements in each of ten relevant areas. Seniors and interns used the same form, although Seniors were asked to anticipate their attitudes and interns to recall attitudes or to describe current reactions. The areas covered included the following: (1) reliability of various sources of information about internship; (2) degree of influence on the choice of internship exerted by each source of information; (3) geographical location; (4) types of hospitals; (5) hospital staffing patterns; (6) types of diagnostic and treatment experience, available; (7) types of instruction; (8) types of supervision; (9) general attitude toward the internship as a part of medical training; and (10) type and amount of consideration given to the choice of an internship.

Although the survey was conducted at the close of two successive years the correlation between 1958 and 1959 classes was so high (median rho + .92) that there is no justification for treating the results separately. The opinions expressed appear to have a remarkable stability from one year's class of Seniors and interns to the next. Thus the total sample reported includes 92

^{*} Associate Professor of Psychology, Department of Psychiatry.

of 137 Seniors and 36 of 72 interns.¹ There is also a very high correlation between the attitudes of senior students and those of interns, but differences of opinion in certain of the areas, although small, are of sufficient interest to merit delineation.

The results will be uniformly presented in order of rank. That is, the most preferred alternative is designated No. 1, the next information. Since the correlation (rho = +.90) between "influence" and "accuracy" is extremely high, it suggests that interns have adequate channels for evaluating internships and, regardless of level of contentment, know what to expect in the hospital of their choice.

which interns attribute to various sources of

Table 3 shows the relative importance

TABLE 1
INFLUENCE OF SOURCES OF INFORMATION

	Seniors' ranking	Interns'
Impressions gained from vis- its to hospitals	1	1.5
Opinions of instructors who have studied or served an internship in a hospital under consideration	2	1.5
Informal opinions of fellow students, interns, resi- dents, or instructors re-	2	1.3
garding the reputation of hospitals being considered	3	5
Opinions of faculty members (including Internship Ad- visory Committee) who have not served or studied in the hospitals being con-		
sidered Opinions of fellow students who have visited hospitals	4	3
under consideration Opinions of personal ac- quaintances among physi-	5	6.5
cians in practice	6.5	8
Opinions concerning the pres- tige of the hospital regard- less of source	6.5	4
Brochures descriptive of in- ternships prepared by hos-		
pitals	8	6.5

most preferred No. 2, and so on.

Table 1 reflects the degree of influence that students attributed to each of several sources of information commonly employed in evaluating internships.

Table 2 indicates the degree of accuracy

¹ The data presented here derive from one part of a more extensive study of the internship program at Billings Hospital. Since we wished to elicit unguarded comments on many details of the program and on the staff members involved, opinions were obtained anonymously. The questionnaire was mailed to all Seniors and interns and followed up after two weeks by a postcard reminder. Under these circumstances, a return of completed questionnaires in excess of 50-60 per cent is not often achieved.

TABLE 2 INFLUENCE VERSUS ACCURACY OF SOURCES OF INFORMATION

	INTERNS' RANKING	
	Influence	Accuracy
Impressions gained from vis- its to hospitals Opinions of instructors who	1.5	1.5
have studied or served an internship in a hospital un- der consideration Informal opinions of fellow	1.5	1.5
students, interns, resi- dents or instructors regard- ing the reputation of hos- pitals being considered	5	3
Opinions of faculty members (including Internship Ad- visory Committee) who have not served or studied in the hospitals being con-	,	3
opinions of fellow students who have visited hospitals	3	4
under consideration Opinions of personal ac- quaintances among physi-	6.5	5.5
cians in practice Opinions concerning the pres- tige of the hospital regard-	8	8
less of source Brochures descriptive of in- ternships prepared by hos-	4	5.5
pitals	6.5	7

attributed to characteristics associated with the geographical location of the training center and clearly illuminates the extent to which the internship is viewed as a vantage point from which to negotiate for desirable residencies. The possibility of gaining sponsorship from established practitioners appears to carry relatively little weight, and motivation toward public service at this stage of training is apparently low.

The clear preference for hospitals with medical school affiliation (shown in Table 4) may in part reflect the student's desire to be in a strategic position with respect to residency training but also reflects his perception of the internship as desirably containing formal didactic features as well as practical experience. It is noteworthy that level of income is unrelated to and, perhaps, negatively correlated with preference. By and large, the internship programs of the federal government and unaffiliated private hospitals provide considerably higher stipends than do those of affiliated hospitals.²

Other data from our questionnaire show that both Seniors and interns in their choice of internships are somewhat more favorably

TABLE 3

RELATIVE IMPORTANCE OF FACTORS IN CHOICE
OF GEOGRAPHICAL LOCATION

	Seniors' ranking	Interns
In the city in which the stu- dent wishes to remain for residency training In the state or region in	1	1
which the student intends to practice	2	3
In a city which has prestige as a medical center In a city in which living con-	3.5	2
ditions are most satisfac- tory	3.5	4
In a city where the student has personal friends in the	5	5
medical profession In a community where the student knows doctors are	3	3
needed	6	7
At or near his medical school	7	6

² It may be of interest to compare preferential ratings of the sample of Seniors reported in this survey with the actual behavior of the total group graduating in 1958 and 1959. The distributions shown below suggest that the sample of Seniors returning the questionnaire is representative of the total group.

Type of hospital in		LASS 1958		ASS 1959	То	TAL
WHICH STUDENT IS SERVING INTERNSHIP	No.	Per	No.	Per	No.	Per
Municipal hospital with medical school affilia- tion Private hospital with	32	47	35	51	67	49
medical school affilia- tion	26	38	23	33	49	36
Municipal hospital with- out medical school af- filiation. Private hospital without	1	2	2	3	3	2
medical school affilia- tion	$\frac{7}{2}$	10 3	5	7 6	12 6	9
Total	68	100	69	100	137	100

disposed toward hospitals with exceptional services (psychiatric, geriatric, pediatric, rehabilitation, etc.). Nevertheless, they prefer hospitals in which the preponderance of patients present a variety of the most common medical and surgical problems. To put this finding another way, students prefer a hospital in which a wide range of specialists practice, but they are reluctant to seek an internship in a setting which concentrates on the highly specialized treatment of a restricted range of medical or surgical problems.

The internship is not perceived as the appropriate point in training to develop

TABLE 4
RELATIVE DESIRABILITY OF TYPES OF HOSPITALS

	Seniors'	Interns'
Municipal or county hospital with medical school affilia- tion	1	1 5
	1	1.5
Private hospital with medical school affiliation	2	1.5
Municipal or county hospital without medical school af- filiation	3	3
Private hospital without medical school affiliation	4.5	5
Military or federal govern- ment hospitals	4.5	4

competence in research, in the use of complex apparatus, or in the interpretation of unusually refined or extensive laboratory data. There is a slightly, but not significantly, greater readiness to develop relative expertness in the diagnosis and treatment of conditions associated with some one medical or surgical specialty or in the problems associated with the general medical care of specialized groups of patients (psychiatric, geriatric, chronic invalids, etc.).

In general, however, despite their interests in eventual specialization, the internship year is seen by most students as one in which they have repetitive experiences with the most commonly encountered problems in diagnosis and treatment.

Tables 5 and 6 reflect preferences with respect to types of instruction and the nature of the supervisory relationships with the

TABLE 6

teaching staff. The responses summarized in Table 6 may reflect the intern's strong dependency-independency conflict. It appears from the rank order of statements on supervision that the intern strives for an optimal distance from supervisory control, which is difficult to achieve. Certainly this period of transition from student status, in which dependency is acceptable, to full professional status, in which independence is expected, must be a troublesome one. It is unlikely that many interns achieve complete comfort

TABLE 5 RELATIVE VALUE FOR LEARNING OF VARIOUS MODES OF INSTRUCTION

	Seniors'	Interns'
Bedside teaching in course of rounds with attending phy- sician without medical stu- dents	1	1
Bedside teaching in course of rounds with attending phy- sician and with medical		1
students	2	3
Case conferences with contro- versial diagnosis and thera- py discussed from varying viewpoints	3	2
Faculty members talk infor- mally about their special- ty, using illustrative cases	4	4
Staff conferences and semi-		
nars	5	5
Scheduled lectures on clinical topics	6	6
Demonstrations of new meth- ods of treatments, special- ized instruments or appa-		
ratus	7	7
Journal club	8	8

in relations with teachers without moving toward one unrealistic extreme or the other. Many of the traditional chronic complaints of interns about food, schedules, and "scut work," as well as undue sensitivity to criticism of their performance by peers or teachers, may with justification be interpreted as being indirect expressions of a status conflict which is difficult to resolve.

The statements appearing on Table 7 suggest that students do regard the internship as a significant period in their career, as measured by the amount of attention given to making a choice—but perhaps more as a

RELATIVE CONTRIBUTION TO LEARNING OF VARIOUS TYPES OF SUPERVISION

	Seniors'	Interns'
Supervisor gives help when he decides intern needs it	1	1
Supervisor gives help only when it is requested by in- tern	2	2
Supervisor allows intern to make insignificant errors	-	
and corrects him later Supervisor watches intern	3	3
closely in his work	4	4
Supervisor withholds advice unless he believes patient is endangered	5	5
Supervisor arranges for in- tern to learn primarily through close observation	3	3
of himself and his col- leagues	6	6.5
Supervisor leaves intern com- pletely on his own	7	6.5
Supervisor gives intern a list of orders and leaves him		
alone	8	8

TABLE 7 PROXIMITY OF VARIOUS ATTITUDES TO

RESPONDENTS' ACTUA	L PROCED	URE
	Seniors'	Interns' ranking
I tried to look beyond the in- ternship itself and select the appointment which would help me most in my medical career	1	1
I tried to judge as carefully as possible what gaps ex- isted in my training and to select internship opportu- nities which were most like-	*	
ly to provide what I need I selected the one place I wanted to go and made every effort to be matched	2	2
for that internship After estimating my chances,	3	4.5
I aimed for the internship which would have the most prestige and which I felt I could make	4	3
I consulted the one or two people whose opinions I most respect and did about		
what they advised I didn't give the internship much thought; I just ap- plied to two or three hopsi- tals where my friends were	5	4.5
applying	6	6

steppingstone than as an end in itself. Students almost uniformly place what might be termed "careersmanship" above "learning for its own sake" as a primary consideration in choice of internship. Additional information derived from interviews suggests that students have a rather exact knowledge of the hierarchy of internship centers with regard to prestige but are under no illusions that the training at prestigeful centers is

sufficiently stable statistically to merit extensive consideration. What is noteworthy is the willingness of both Seniors and interns to consider alternative types of internship experience. The evidence from this survey suggests that students would be receptive to innovation and that perhaps consideration should be given to the development of several types of "fifth-year" experience related to differing professional aims of students.

TABLE 8

RELATIVE DESIRABILITY OF VARIOUS FORMS OF TRAINING IN THE FIRST POST-GRADUATE YEAR

	Seniors' ranking	Intern
The internship in its present form is essential for profes- sional growth and should not be altered	1	1.5
The internship should be re- placed by a fifth year of medical school devoted al- most wholly to supervised practical experience in		
treatment and diagnosis	2	1.5
Medical students should go directly into specialized training via expanded resi-		
dency training programs The internship is not serv- ing a useful purpose and should be replaced by a	3	3
modernized apprenticeship system The internship should be re- garded as a service obliga- tion rather than as addi- tional training; hence med-	4	4
ical school graduates should be assigned where they are most needed	5	5

necessarily better in terms of other criteria.

In Table 8 there is an interesting discrepancy between the attitudes of Seniors and interns regarding the form the internship should take. Although both groups place the same three statements in the first three ranks, the interns are somewhat more willing to consider altering the form of the internship to a fifth "practicum" year in their medical school than are the Seniors. However, we have no additional data to aid us in interpreting this result, and, indeed, the difference between the two groups is not

SUMMARY

Senior medical students have highly stable opinions with regard to factors bearing on their choice of an internship, and interns in retrospect select virtually identical factors as having been of prime importance. In selecting an internship, the average student in the sample surveyed depends most heavily for information on visits to hospitals and on opinions of instructors who have served their internship in the hospitals under consideration. In general, students prefer a municipal or county hospital with a medical school affiliation in a city in which the student wishes to obtain residency training. Interns and Senior students prefer a hospital staffed with specialists but with a patient population offering a wide range of the most common medical and surgical conditions. Both Seniors and interns prefer bedside teaching in the course of rounds with attending physicians but without participation of undergraduate medical students, and they seek a supervisory relationship in which the teacher decides when to intervene but also one in which they are not under close, critical surveillance. The internship is modally perceived as a potential means of self-advancement rather than exclusively as a means of enhancing knowledge, and most students would be receptive to alternative programs of practicum training in their fifth year.

REFERENCES

DOLKART, R. E., BROSSARD, J. McJ., and Cooper, J. A. D. Hospitals Which Do Not Fill Their Intern Quotas. J. M. Educ., 33:721, 1958.

The Use of Experiments in Undergraduate Teaching of Pathology

Report of a Conference at Western Reserve University*

DONALD B. HACKEL, M.D.†

Department of Pathology, Western Reserve University School of Medicine at Cleveland Metropolitan General Hospital, Cleveland, Ohio

The traditional undergraduate course in pathology has been subjected to some criticism in recent years (1). This has not been directed primarily toward its adequacy in the presentation of factual material but rather to its relative lack of success in attracting medical students into academic pathology and medical research. It is hard to match the appeal of the clinical services for the young student, but it is important for the future of medicine that a reasonable share of the most inquisitive and capable members of this group be stimulated to work in the basic medical sciences. The pathology course, because of its strategic position in the curriculum and because of its broad scientific nature, should be a much more effective recruiting force than it seems to be at the present time.

At the "Symposium on Increasing the Research Potential in Pathology" held at the National Institutes of Health in 1954, the causes of the inadequate research potential in pathology were considered, and a number of recommendations were made to improve the situation (10). One of these recommendations was that "medical students be provided with opportunity to perform experiments in pathology as part of their curriculum, in order to emphasize the dynamic con-

cept of disease and provide some experience in experimental methods." This is certainly not a revolutionary proposal, since experiments in the undergraduate teaching of pathology have been sporadically used since the beginning of the century (3, 6) and have been advocated with more (5) or less (4) enthusiasm for many years. Nevertheless, in 1957 a survey of all the medical schools in the United States and Canada revealed that only 17 of them had an organized program for the use of experiments in correlation with their regular undergraduate pathology course. This figure does not include the numerous schools which encourage interested individuals to elect research work with staff members during the school year or as a summer fellowship.

The Intersociety Committee for Increasing the Research Potential in Pathology appointed a subcommittee in 1957 with the assigned task of implementing the recommendation to encourage more widespread use of experiments in undergraduate teaching of pathology. The subcommittee felt that the best way to attain this goal would be by means of a workshop-type conference at which the experiences of those departments of pathology that have been using experiments could be made available to representatives of other schools who might be interested in adapting them to their own programs.

The support of the United States Public

^{*} This Conference was supported by a grant (2G-245) from the United States Public Health Service.

[†] Associate Professor of Pathology.

Health Service was obtained, and the first "Conference on the Use of Experiments and Audiovisual Aids in the Undergraduate Teaching of Pathology" was held at Western Reserve University on June 16–21, 1958. A second similar conference was held on June 22–26, 1959.

The "faculty" of the workshops was made up of representatives of the pathology departments of eight medical schools. This included the University of Kansas (R. E Stowell and J. K. Frenkel), University of Chicago (R. Wissler, M. Moskowitz, and F. Fitch), University of Arkansas (H. Schlumberger), Northwestern University (W. Wartman, W. Hill, and R. Jennings), University of Pennsylvania (Charles Breedis), Washington University (W. S. Hartroft and Phyllis Hartroft), University of Florida (Joshua Edwards), and Western Reserve University (D. B. Hackel, T. D. Kinney, and A. R. Moritz).

These departments had been active in the utilization of experiments in their own undergraduate programs for a number of years. The types of experiments and the manner of their presentation within the curriculum, however, varied from school to school. It was thereby made apparent that the successful use of experiments in one setting might be ineffective in another, and the various local conditions that influenced the choice of program were brought out in the discussions with each group.

Notices were sent out to the departments of pathology of the United States medical schools inviting them to nominate a participant from their faculty who "is a full time staff member, actively engaged in teaching and/or research and who would be in a position to contribute any useful ideas derived at the conference to the teaching program of his own department." The first 24 replies to the invitation were accepted each year. This limit was set so that the group would be small enough to permit free exchange of ideas and active participation in the experiments. Now, in retrospect, it does seem that this was an optimum number for this purpose. The fact that over 71 different medical schools desired to participate in the two conferences probably reflects a current active interest in teaching methods throughout this country.

The pathology course at the University of Kansas was described by Dr. Robert E. Stowell (9). A series of 12 experiments have been conducted by the students each year. Included are experiments on infarction, methylcholanthrene tumors, inflammation, burns, scurvy, carbon tetrachloride, diphtheria toxin, tuberculosis, body irradiation, pneumonia, experimental hypertension in rats, and production of cirrhosis in rats. These experiments are an integral part of the teaching program and fit in with the subject being taught in the over-all program of pathology instruction. Interdepartmental correlation is also attempted and is most effective in working with microbiology, public health, and physical diagnosis (9).

The class is divided into eight groups of twelve students and each group is subdivided into four teams. Each team performs three experiments, and the results are presented at a conference of the entire group, so that all students become familiar with the complete series of experiments. The conference is probably the most important part of the exercise and is used not only to permit critical discussion of results but to introduce the students to original literature sources and historical aspects of the subject. Above all, the conference is utilized to emphasize the importance of the changes found in the animal experiment in relation to what one might be expected to see in human disease processes.

In evaluation of their program of experiments, Dr. Stowell pointed out that one cannot rely too heavily on the majority of current student opinion, since some students prefer to be told what they need to know to pass the next examination. The purpose of the experiments is to engender a more mature appreciation of certain areas of knowledge rather than to transmit factual material. A variety of other teaching methods is used for this latter purpose. Dr. Stowell does not recommend experiments of this sort to

teach research methodology, nor does he feel that they are the main means of recruiting future pathologists. Separate elective investigative work with individual staff members is encouraged and functions more

effectively in this area.

The manner in which experiments are used at the University of Pennsylvania was described by Dr. Charles Breedis (2). A separate laboratory is available for the experimental course, and each student carries out all the 18 experiments, working usually in groups of four. The experiments are presented essentially as a separate "course," but they run concurrently with the regular second-year pathology course and are arranged to fit in as much as possible with the didactic material that is being presented. The course is given Monday through Thursday in the mornings, taking one-quarter of the class each day, so that in any one week the same experiment is done each day. The experiments include studies of circulation of the rabbit's ear, carbon tetrachloride effect on the liver, inflammation, carcinogenesis, Arthus' phenomenon, renal necrosis, peritonitis, liver regeneration after partial hepatectomy, transplantation of neoplasm, hypertension, alloxan diabetes, papilloma virus, tumor embolism, mercuric chloride nephrosis, irradiation, biliary obstruction, and phagocytosis.

It is the feeling at the University of Pennsylvania that as much of an experiment as possible should be performed by the student himself and that demonstrations by others are not so valuable to him. Sometimes, however, the technic is so difficult or time-consuming that part of the experiment is best presented as a demonstration. Original research by the students is encouraged, and they may be excused from the formal course if they are engaged in individual research projects in a basic science department.

The experimental course at Northwestern University was described by Drs. Wartman and Hill (1958) and by Dr. Jennings (1959). A total of 12 experiments is performed by all students in the class, working in teams of four students each. All teams participate in all experiments, and the results obtained by the teams are discussed in unit groups of ten teams each. The individual findings of the students form the basis of the discussion. Extensive student participation in the analysis of their results is almost always achieved. Included in the course are experiments on mercuric chloride nephrosis, active and passive hyperemia, inflammation of frog mesentery, peritonitis, chemical carcinogenesis, tumor transplantation, wound healing, propylthiouracil effect on thyroid, carbon tetrachloride effect on liver, and acute radiation injury.

The experiments, although performed in a separate laboratory, are an integral part of the pathology course at Northwestern. They are used for the chief purpose of making clear to the students that disease is an ever changing process and that it occurs in living animals rather than dead bodies. The experiments also permit the study in depth of selected subjects and in this way raise in the student's mind new and unanswered questions and make clear to him the defects in our knowledge. Although the students learn a certain amount of experimental technic and gain firsthand acquaintance with the experimental method, these are considered secondary rather than primary reasons for using experiments in pathology. If the objective is to produce experimentalists, then it is believed that only a few selected students should be chosen and assigned to bench work with experimentalists of expe-

The pathology department of the University of Chicago utilizes a different technic from that employed by the University of Kansas, the University of Pennsylvania, and Northwestern University. Experiments are presented to the students of the University of Chicago as a series of "Demonstrations of Dynamic Pathology." Twelve demonstrations are included and are correlated with the subject matter of the regular pathology course and include the following: passive hyperemia of the liver, intestinal infarction, acute intradermal infection in rabbits, thrombocytopenia due to antiplatelet

serum, inflammatory edema, acute pyelonephritis, cholesterol-induced atherosclerosis in the rabbit, and immune hemolytic anemia. In several instances the disease processes dealt with by the demonstrations reflect the research interests and contributions of the department.

At the meeting Dr. Wissler presented the demonstration of a "model intradermal infection" in rabbits and its modification by various agents, Dr. Moskowitz (1958) demonstrated the effects of experimentally produced thrombocytopenic purpura in guinea pigs, and Dr. Fitch (1959) demonstrated the effects of immune hemolytic anemia in mice. The advantages and disadvantages of this type of presentation were discussed. It was apparent that this can be an excellent way to demonstrate dynamic pathogenesis and that it is economical of students' time and of space and equipment. Furthermore, the demonstrations can be carefully prepared, and the results will be relatively predictable. The obvious disadvantages of this method lie in the passive role of the student. However, it was pointed out that the demonstrations, for the most part, are so designed that if it is desired, they can be modified to permit active participation in various aspects. For example, the preparation of guinea pigs with antiplatelet serum can be done beforehand by two or three volunteer students, and the results on blood clotting, etc., can be demonstrated by selecting a student to perform the tests before his small group. As the demonstrations are utilized, they are intended only as supplementary teaching technics and not as recruitment devices. The quarter system and the unusually open curriculum at the University of Chicago give a good opportunity for student-teacher work on research projects. Much of the interest of the students in pathology as a specialty comes out of this close and continued contact over the four-year period.

The use of a broader spectrum of biological material, to supplement classical experiments, was recommended by Dr. Schlumberger of the University of Arkansas. He gave numerous examples of appropriate sub-

jects to stimulate students' interest in comparative pathology. These ranged from gall formation in plants as a facet of oncology to regeneration experiments in planaria, the use of the anal gills of mosquito larvae to study membrane phenomena, and the observation of the lime sacs of frogs to illustrate features of calcium and vitamin D metabolism. The simplicity of the frog tongue or mesentery preparation to demonstrate features of the capillary circulation was pointed out, as was the use of the tadpole's tail to illustrate effects of freezing. The use of this type of material from a varied biological source is justified not only because of its availability and appropriateness in a pathology course but also because it should have the added advantage of giving students an insight into the place in nature of man and his diseases.

Dr. Schlumberger also previewed the Manual of Experiments in Pathology which he has edited and which has subsequently been published as a supplement to Laboratory Investigation (8). He recommended this as a practical working manual for use in student laboratories, with experiments included which are intended to illustrate the basic problems of general pathology.

At the 1958 conference Dr. W. Stanley Hartroft described the teaching program at Washington University. At that time experiments were done by students on a voluntary basis. They could choose from a list of experiments, each arranged by a faculty member actively engaged in that area. During the 1958-59 school year "drastic alterations" were made in the undergraduate pathology course, with the latter half of the course being devoted almost entirely to experimental pathology. The general plan used in most of these teaching sessions was to have an initial session in an amphitheater, with technics being demonstrated with the aid of black-and-white closed-circuit television. The results of the experiments were similarly demonstrated, the animals being dissected in front of the class. Color photographs both gross and microscopic of animals that had been killed earlier were presented at these sessions. The sessions might take until 10:00 to 10:30 A.M., having started at 9:00 A.M. This was usually followed by a session in the laboratory, where the students had an opportunity to examine previously prepared microsections from the animals that had been presented and to compare these with similar or related lesions in man. The final hour of the morning was devoted to a discussion of the significance of the experimental animal results in relation to diseases in man. It was in this last session, particularly, that those aspects of special pathology that were not covered elsewhere in the course were presented.

Dr. Hartroft reported that this rather marked variation from the usual type of material presented in the undergraduate course has not met with a favorable student reaction. Many students felt that the course did not include sufficient of the classic descriptive type of pathology and feared that they might not be prepared adequately for their National Board Examinations.

Dr. Joshua Edwards described the use of experiments within the curriculum at the University of Florida as part of an attempt to train a "wise physician" and to avoid the presentation of "inert ideas"—that is to say, "ideas that are merely received into the mind without being utilized or tested or thrown into fresh combinations" (12). Virtually all conventional teaching methods are employed in the teaching of pathology throughout the second year. A large number of experiments and demonstrations is carried out in detail by the students which are intimately connected with the programs of both pathology and microbiology. Experiments include immunologic studies, anaphylaxis, autolysis and regeneration, hypertrophy, early changes in inflammation, carbon tetrachloride and mercuric bichloride intoxication, dietary deficiencies, and other experiments.

The final portion of the conference was devoted to a discussion of the use of experiments in the undergraduate teaching at Western Reserve University. This was preceded by some general orientation on the "experiment in medical education" that has been in progress at Western Reserve University since 1952 (7). From the onset of this Western Reserve program, there has been general agreement that total coverage of the accumulated mass of knowledge is not practical. As expressed by Dr. Joseph Wearn, emphasis is rather placed on "the basic concepts, the mechanisms of disease, continuing self education, the development of a scientific critique, the development of powers and skills and the inculcation of ideals" (11). It would be reasonable to include the use of experiments in the implementation of these concepts.

One of the features of the revised curriculum is the shifting of primary responsibility for the immediate presentation of material away from departments and into the hands of "subject committees." These interdepartmental committees are responsible for the integrated presentation of the material covering certain areas. As an example of the manner in which these actually function, the activities of the current Urinary Disease Committee were cited at the conference. This committee is composed of representatives of five departments: biochemistry, internal medicine, urology, pediatrics, and pathology. It has the responsibility of teaching all aspects of diseases of the urinary system in 91 hours over a five-week period. The two experiments which are performed by the entire class begin in the first week of the course and are concluded in the third week. In order to study experimental nephritis, each two students have a rabbit which they inject with previously prepared duck antirabbit kidney serum. The preparation of the nephrotoxic serum takes about three months, which is too long to enable the students to participate directly. Therefore, a short motion-picture film was previously prepared to illustrate this procedure and is shown to the students immediately before they inject their animal. They follow this rabbit with daily urinalyses. At the same time, they are introduced to the technic of

urinalysis and examine urine specimens from

cases of human nephritis, nephrosis, and

pyelonephritis. Albuminuria shows up in the rabbits six or seven days after the start of the experiment and at about the same time that clinical cases of nephritis and nephrosis are being demonstrated and discussed. The rabbits are sacrificed a week later, at which time most show marked ascites, hyperlipemia, and azotemia and have large, pale kidneys. Microscopic sections of the kidneys are available the next week and are studied in comparison with the slides of human acute glomerulonephritis in the class collection. A three-hour conference of the entire class is held during the fifth and final week of the course, at which time the results are presented. Various aspects of the experiment are assigned for student presentation, including review of original articles on historical aspects of the experimental disease; analvses are given of the relation of the experimental disease and certain aspects of human nephritis and nephrosis; and immunologic factors are discussed. The entire class also carries out an experiment on pyelonephritis in rats which is similarly correlated with the study of the human disease and with other studies reported in the literature. A final conference of the entire class is held to discuss these results. These two animal experiments are therefore used to point up certain features of the human disease, to serve as a means of introducing students to historical and current attitudes toward these diseases, and to attempt to stimulate the development of critical and scientific attitudes.

In addition to the demonstration and performance of experiments, several other facets of a dynamic approach to study and teaching were presented at the conferences: (1) the use of television, described and demonstrated in various potential applications by Drs. Bernard Dryer, Charles Loeser, Sid West, and L. Adelson (all of Western Reserve), by Drs. Dave Ruhe (Kansas), W. S. Hartroft (Washington University), and C. Breedis (University of Pennsylvania); (2) the use of teaching films, discussed by Drs. Dryer and Ruhe, and by Dr. J. Meyer (the latter representing the Subcommittee on Motion Pictures of the Intersociety Com-

mittee); (3) the rabbit-ear chamber technic, presented by Dr. Robert Ebert in relation to the teaching film Dynamics of the Tubercle; (4) quartz-rod technic for studying the microcirculation (Dr. Edward Bloch of Western Reserve); and (5) a discussion of some principles of effective public speaking as applied to medical school teaching by Mr. Robert Lang (Western Reserve). Although the presentation of the various teaching methods was incidental to the main purpose of the conferences, a number of participants indicated that this instruction was of particular value and that it pointed out areas which were deficient in their own training as teachers.

It is hoped that these conferences have aroused an interest in the use of experiments in the undergraduate teaching by departments of pathology that have not previously utilized this teaching technic. Whether or not this will result in the recruitment of more and better students by basic medical science is not certain, but it is probably one of a number of activities that one might expect to lead in this direction. Several participants in the conferences pointed out that local conditions will often dictate what specific teaching methods can or cannot be employed. All seemed to agree with the main theme of the conferences, namely, that the continuing re-evaluation of didactic technics and the trial of different methods are necessary for the production and maintenance of a dynamic teaching program.

REFERENCES

- Angrist, A. A. A Course in Pathology To Promote Interest in the Specialty. J. M. Educ., 34:592-96, 1959.
- COMAN, D. R., and BREEDIS, C. A Course in Experimental Pathology for Medical Students. J. M. Educ., 28:47-51, 1953.
- FURTH, J. The Teaching of Experimental Pathology. Arch. Path., 34:75-91, 1942.
- GOODPASTURE, E. W. The Use of Experimental Procedures in the Teaching of Pathology. South. M. J., 25:991-95, 1932.
- KARSNER, H. T. Teaching the Pathology of Function. J.A.M.A., 75:261-63, 1920.

- MACCALLUM, W. G. On the Teaching of Pathological Physiology. Johns Hopkins Hosp. Bull., 17:251-54, 1906.
- PATTERSON, J. W. Western Reserve. 3. Interdepartmental and Departmental Teaching of Medicine and Biologic Science in Four Years. J. M. Educ., 31:521-29, 1956.
- Schlumberger, H. G. Manual of Experiments in Pathology. Lab. Invest., 8: 1013-1146, 1959.
- 9. STOWELL, R. E. Correlated Teaching of Pathology with Other Disciplines to Sopho-

- more Medical Students. J. M. Educ., 29: 24-28, 1954.
- Symposium on Increasing the Research Potential in Pathology. Lab. Invest., 3: 377-450, 1954.
- WEARN, J. T. Western Reserve. 1. Background and Philosophy of Experiment. J. M. Educ., 31:516-18, 1956.
- WHITEHEAD, A. N. The Aims of Education and Other Essays. New York: Macmillan Co., 1929.

The Placebo Effect in Medical Education

PAUL J. SANAZARO*

University of California School of Medicine, San Francisco, California

You...should each of you tell us who is the most skillful educator whom you have ever known; and whether you invented the art yourselves or learned of another; and if you learned who were your respective teachers and who were their brothers in the art. But if you are yourselves original discoverers in that field give us some proof of your skill. Who are they who, having been inferior persons, have become under your care good and noble.—Plato.

Modern medical research, mechanized and efficiently organized, at once impresses and reassures us that the future of scientific medicine is sound. The rising tide of literature was initially gratifying; now many compare our state with that of the sorcerer's apprentice. Rapid extension of knowledge by analysis ultimately leads to a strong desire for commensurate synthesis, as well as concern that general appreciation of cultural values not suffer in this process. These are reflected in the current mid-century evaluation of medical education. Many motives, however, parade under this banner.

Lest we feel unjustifiably creative in our approaches to these problems, we should keep in mind that *re*-discovery and *re*-emphasis of ideas are the rule in the history of medical education.

The earliest complete and lucid definition of the important interrelationships in medical education is stated in the Hippocratic writings:

Whoever is to acquire a competent knowledge of medicine ought to be possessed of the following advantages: a natural disposition; instruction; a favorable position for the study; early tuition; love of labor; leisure. First of all a natural talent is required; for, when Nature opposes, everything else is vain; but when Nature leads the way to what is most excellent, instruction in the art takes place, which the

student must try to appropriate to himself by reflection, becoming an early pupil in a place well adapted for instruction. He also brings to the task a love of labor and perseverance, so that the instruction taking root, may bring forth proper and abundant fruits [5].

In Hippocratic medicine the "essential habits," "basic skills," and "sound attitudes" (9) deemed desirable in a physician are clearly defined, as are "professional and ethical principles" in the Oath. Medical students were carefully chosen, and most often were sons of physicians. Personal instruction in medicine, including supervised clinical experience, was incorporated into Roman medical teaching. Even then, students had cold hands, and Galen complained of his students' inability to read and speak as befitted learned men (10). One must wonder about the course of medical history if Galen had not been a queer mixture of scientist, sophist, and teleologic philosopher and, most unfortunately, a failure as a teacher.

The prototype of modern medical education appeared in the thirteenth century, when some medical schools became associated with forerunners of universities. At one time at Salerno the prescribed premedical course consisted of three years' study of logic (the scientific method of the times), and the medical curriculum of five years was largely devoted to reading Latin

^{*} Associate Professor of Medicine.

translations of the ancient books and listening to lectures based on the same sources. Proof of satisfactory completion of requirements and one year's apprenticeship to an established practitioner were needed before the new physician could receive his state license. In the Middle Ages the majority of students came from middle-class families, but some academically promising lads from the lower classes were encouraged and subsidized so that they might enter medicine. Many students, to the detriment of their studies, were forced to work long hours outside of school for their tuition expenses. Student bodies at times participated in planning the curriculum. Bedside teaching and the use of the post mortem examination in teaching were established at Padua in the sixteenth century. While Vesalius attracted students widely because of his brilliance in teaching and research, it was under Stratenus in the seventeenth century that students actually assisted in dissection. Stratenus also proposed that teaching is more effective when both auditive and visual methods are used.

Students and teachers moved about from school to school in the sixteenth and seventeenth centuries during the rapid advances in physical and biologic sciences made possible by application of the scientific method and powerful new tools for research. Sydenham then re-established the importance of Hippocratic principles in medical practice. Early in the eighteenth century the average physician was bewildered by the very mass of new scientific knowledge and by the increasing number of medical journals. Boerhaave defined modern clinical medicine: an integrative art embracing relevant scientific knowledge and technics in the over-all evaluation of the "whole patient" and applying the best personal, technical, and scientific modalities of treatment.

The development of the basic medical disciplines in the nineteenth century had little influence on medical teaching elsewhere than in Germany because the apprentice-preceptor system was still widespread. The early twentieth-century revolution in

medical education incorporated the basic sciences into the curriculum of universityaffiliated medical schools, thereby strengthening clinical medicine greatly. Now, at mid-century, research activity and prestige are at their zenith, and clinical endeavor

is under scrutiny.

It is worth noting that the basic methods of medical teaching have long been known and that their effectiveness and popularity have been dependent upon particular teachers. Although the advent of scientific knowledge (by contemporary criteria) is quite recent by comparison, its continual expansion has generally been accompanied by the fear that its projected vast scope will somehow squeeze out of would-be physicians' minds the awareness-much less appreciation-of our more ancient cultural and ethical heritage. Two major trends in medical education which reflect this concern are, first, a search for curriculum designs which will facilitate integration and understanding of basic principles and "requisite" facts, while at the same time equipping students for lifelong self-education, and, second, a re-emphasis on the desirability of a broad education, especially study of the humani-

Some of the resulting experiments in medical education may be compared to clinical research. But while some elements of the educational process can be analyzed by the scientific method, the presence of student and teacher introduces variables which are difficult to control. Study of medical teaching may be compared to clinical experiments in drug therapy, the curriculum being the counterpart of the pharmacologic agent, as the teacher and student are respective counterparts of physician and patient. In studies on the action of drugs, three mechanisms may be found responsible. singly or in combination, for the observed effects, namely, the pharmacologic potency of the therapeutic agent, the power of suggestion inherent in the therapeutic situation, and bias on the part of the patient, the physician, or both. It is because of these considerations that a properly controlled clinical trial requires the use of (1) a placebo indistinguishable from the drug under study and (2) the double blind technic. Since, for obvious reasons, these cannot apply to the study of educational methods, a scientifically controlled investigation of medical curriculums is, at the outset, technically impossible. Nonetheless, a number of reports have compared the educational results from different course contents or teaching methods (1, 3, 4, 6). In these, the control and experimental groups of students are generally carefully chosen by an appropriate sampling technic, but the details of faculty selection are, by contrast, sketchy or even omitted—especially with respect to those teachers in the traditional curriculum. Impressive and even statistically significant differences in resultant performance and attitude have been reported.

Two important deviations from the pattern of sound clinical study are the failure of the same instructors to teach both the control and the experimental groups and, of course, the students' awareness that experiments are in progress. But the key factor in the list of variables beyond technical control is the placebo effect. I include in this term not only the placebo itself, which I define as an inert substance given to alleviate distress not amenable to specific therapy, but also the favorable effect of a physician's understanding and interest. Although defined as "inert," placebo (and suggestion) may induce objective physiollogic and biochemical changes in human beings' (13). I believe that a similar mechanism may be involved when a teacher "stimulates" a student to learn.

Far from being merely a partially uncontrolled variable, the placebo effect in its broad sense may be primarily responsible for many observed results in current education research. A placebo's effectiveness may be enhanced by its route of administration and by its size, shape, color, and taste. It is reasonable to assume that new and attractive curriculums, cohesive student groups, new physical facilities, and national publicity may likewise enhance the apparent

effectiveness of new educational programs. The instructors in such experiments are young in spirit, if not in flesh, interested, eager, and sympathetic to student needs. Students in turn are responsive to heightened faculty interest in their problems. Thus, when it is reported that in such circumstances a new curriculum resulted in equal or greater educational achievement than standard courses, one wonders what might have happened in the absence of the manifest placebo effect. Conversely, might not the results from the traditional system have been better if comparable placebo factors had been deliberately applied? And, finally, what might well happen if such new curriculums, in their turn, come to be "standard"?

My thesis is simply this: If a superior combination of curriculum and teaching methods as such exists, it should have been determined long ago. Superior attainment of educational goals attributed by some to new curriculums should be ascribed in large measure to the interaction of eager students, especially attracted to the proposed plan and its educational philosophy, and an enthusiastic, talented faculty which also understands the students' difficult task in becoming doctors.

The fallacy in assigning priority to curriculum design in modern medical education can be highlighted by continuing the analogy between teaching and clinical therapeutics: no one would claim that the development of pure, potent drugs is the major factor in insuring the welfare of patients; rather, it is their proper use by a competent physician. Curriculum and faculty can be separated as readily as the right and left ventricles: a useful concept for the analysis of dynamics but never a physical reality. The curriculum is, at best, a check list of objectives; practically speaking the only important "new curriculum" is that which accrues as new faculty members are appointed.

Integrated courses intended to facilitate student grasp of interrelated subject matter have been likened to relieving thirst by in-

haling a mixture of hydrogen and oxygen gas. Each individual's personally integrated concepts in medicine develop slowly and require not only a broad base of knowledge but continued study and reflection. I believe that such hard-won perspectives can be bestowed on the young student as readily as the skills of mountain climbing can be shared with others by passive transfer. Evidence is lacking, to date, that student achievement and outlook are significantly enhanced by the integrative approach in itself. The descriptions of such programs make it clear that the placebo effect operates strongly

Certain other tendencies in medical education could be classified as placebo therapy given despite need for and availability of specific remedy. One such may be the inclusion of courses in the art of interviewing patients and "establishing rapport" given under the auspices of departments of psychiatry with assistance from social scientists. What is the effect upon medical students when this fundamental aspect of clinical medicine is taught as an isolated exercise rather than by embodiment in all clinical teaching?

A similar instance of placebo therapy may be the incorporation of the humanities within the medical curriculum. This in itself insures student attainment of a cultural background and humane outlook as much as performance of laboratory experiments in itself insures knowledge of the history of science and development of an abiding scientific attitude. It is primarily by precept that such goals are shown to be important and relevant in the study of medicine (11). Furthermore, if inclusion of cultural courses is felt to relieve the medical school faculty of individual responsibility for imparting such values, then what is being proposed is a corporation of liberal arts college and medical vocational school. The term medical education implies that all medical teaching is placed in the larger context of human experience and that technical data and skills are presented in the perspective of ethical, wholesome, human endeavor.

The so-called traditional medical curriculum would be greatly enhanced in effectiveness by the realization that the desirable qualities and qualifications of a physician are identical with those of a good teacher and that the basic tenets of clinical medicine are identical with those of sound teaching. The physician fulfils a dual role. On the one hand, he is basically a medical scientist, possessing knowledge, understanding, and technical skills which he applies in the most appropriate manner for ascertaining the nature of the patient's problem. After this, cure, alleviation or preventive measures are applied, and, in this, patient participation is essential for optimum benefit. On the other hand, the patient does not wish to be dealt with "scientifically"; he comes for help or relief. The physician therefore approaches the patient on the level of human understanding and, in this framework, applies his scientific knowledge for the good of the patient. In the context of medical teaching, teacher and student are exact counterparts of physician and patient. If we are to teach students to deal with the "whole patient," we should deal with the "whole student."

But one thing is needed. Just as the practitioner of clinical medicine must possess scientific medical knowledge if he is to benefit his patients fully, so should the teacher of medicine know and apply sound principles of medical education. If it is true that the equivalent of 8 or 10 or 20 new medical schools must be established in the coming decade, it would seem essential that men who will constitute their faculties appreciate their responsibilities as teachers: it is the individual teacher, not the curriculum that helps the student realize educational goals. Each teacher should develop his ability to (a) enhance learning and understanding of facts and principles, (b) stimulate development of desirable student attitudes and habits, or (c) teach the basic skills of medicine. The technics which are most successful for developing keen medical scientist-researchers will differ in part from those which develop the "ideal" basic clinician. Certainly it would seem that understanding of these aspects is second in importance only to the scientific competence of prospective teaching faculty members.

Without in any sense detracting from the value and importance of curriculum analysis and experimentation, I would suggest that greater immediate benefit will result from instruction of faculty members in the principles and technics of effective teaching. Provision for this should be a faculty elective. This may not affect senior faculty members, since willingness to be taught and faculty seniority are reported to be inversely proportional (2).1 The project in medical education begun at the University of Buffalo may help define constructive approaches to this problem (8). Ideally, the Association of American Medical Colleges should eventually function as a central resource center for schools wishing to initiate such programs.

As may be surmised, this is but a reemphasis of an old idea: "I feel that better pedagogic leadership would give better results. I wonder whether we shall some day have medical normal schools and teachers who shall teach us how to teach" (7).

This discussion has been but another attempt by subterfuge of title to emphasize the central role of able teachers and properly selected students in medical education: when both are appropriately endowed and motivated, desirable educational goals will be readily achieved. The influence of studentteacher interaction has been generally underestimated in evaluating new curricular designs, much as the placebo effect may obscure truth in clinical therapy. In medical education, proper application of "placebo factors" may be beneficial; but misdirected placebo therapy is always dangerous, for it obscures the basic defect and delays application of specific therapy. The analogy between clinician and teacher is ancient but still uniquely apt. The traditional definition of a clinician is "one who has a predominating thoughtfulness for the welfare of his patient." Should not the teacher have a predominating concern for the education of his student?

REFERENCES

- BRIDGE, E. M. Experimental Projects in Medical Teaching. J. M. Educ., 29(3):17– 24, 1954.
- COMROE, J. H., JR. Group Instruction in the Art and Techniques of Lecturing. J. M. Educ., 29(6): 39-41, 1954.
- 3. GIUS, J. A.; BLOMMERS, P. J.; MEYERS, R.; and TIDRICK, R. T. The Effect of Voluntary vs. Obligatory Textbook Assignments and Recitations on Learning Principles of Surgery. J. M. Educ., 34:657-61, 1959.
- GOLDSTEIN, A. A Controlled Comparison of the Project Method with Standard Laboratory Teaching in Pharmacology. J. M. Educ., 31:365-75, 1956.
- Hippocratic Writings: The Law. Translated by Francis Adams.
- LIFSON, N.; REMPEL, P.; and JOHNSON, J. A. A Comparison between Lecture and Conference Methods in Teaching Physiology. J. M. Educ., 31:376-82, 1956.
- Lyon, E. P. The Relation of the Laboratory Courses to the Work of the Clinical Years. J.A.M.A., 66:629-31, 1916.
- MILLER, G. E., and ROSINSKI, E. F. (eds.).
 A Summer Institute on Medical Teaching: Report of a Conference. J. M. Educ., 34: 449-94, 1959.
- The Objectives of Undergraduate Medical Education. J. M. Educ., 28(3):57-59, 1953.
- Puschmann, T. A History of Medical Education pp. 113, 99. Translated and edited by E. H. Hare. London: H. K. Lewis, 1891 pp. 113, 99.
- WATSON, E. H. By Precept—a Critical Appraisal of Medical Teaching. J. M. Educ., 28(5):11-16, 1953.
- WEARN, J. T. Western Reserve. 1. Background and Philosophy of Experiment. J. M. Educ., 31:516-18, 1956.
- WOLF, S. Effects of Suggestion and Conditioning on the Action of Chemical Agents in Human Subjects—the Pharmacology of Placebos. J. Clin. Invest., 29:100-109, 1950.

¹ This has many interesting connotations, of course. Pertinent here is the question of the senior faculty's effectiveness in teaching students to prepare for a life of continual learning.

Samuel Henry Dickson (1798-1872)

JOSEPH IOOR WARING, M.D. Charleston, South Carolina

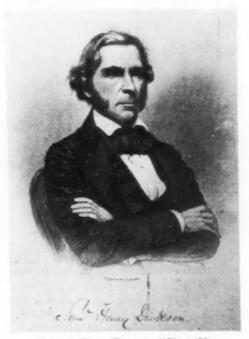
Samuel Henry Dickson, of Charleston, South Carolina, who was among the relatively few vigorous and vocal proponents of reforms in medical education during the early part of the nineteenth century, was largely responsible for the establishment of the first southern medical school, the Medical College of South Carolina. As an advanced educator, a prolific writer, a capable orator, and a beloved citizen, he left a marked impression on his contemporaries and the many institutions with which he was associated in Charleston and later in New York and Philadelphia.

The most authentic account of Dickson's career is found in his own memoranda registered in a small ledger that came into the hands of Dr. Samuel X. Radbill some years ago and which was the basis for his article published in 1942. Any addition to that comprehensive article must be chiefly in regard to Dickson's educational activities, which he himself does not mention at any length in his notes and which might be largely forgotten, had he not become embroiled in a controversy that provoked a number of pamphlets in which Dickson's efforts are exposed to brighter light.

Samuel Henry Dickson, who was born of Scotch-Irish parents in Charleston in 1798, was educated at the College of Charleston and at Yale College. He entered Yale as a Sophomore in 1811 and was graduated from there with the degree of Bachelor of Arts in 1814, when he was just under sixteen years of age. He volunteered for service in the then-current war but saw no active duty.

¹ S. X. Radbill, Samuel Henry Dickson, Pioneer Southern Medical Educator. Ann. M. Hist., 3d ser., 4:382-89, 1942.

In 1814 he returned to Charleston, where he served under Dr. P. G. Prioleau for some time before proceeding to the University of Pennsylvania, where he took two courses of lectures and received his M.D. degree in



SAMUEL HENRY DICKSON (1798-1872)
(From the Library of the College of Physicians,
Philadelphia)

1819. His doctoral thesis was on the History of Yellow Fever in Charleston in 1817.

In 1819 Dickson returned home to begin practice, which, he says, was discouragingly slim until an epidemic of yellow fever attacked Charleston in July of that year. He was soon selected as an assistant to Dr. Charles Glover, who had been put in charge of a temporary yellow-fever hospital in Hampstead. During Dr. Glover's absence, Dickson was in complete charge of the hospital as well as the Marine Hospital of the city. In the following year he went into partnership with Dr. Glover and eventually



THE FIRST PERMANENT BUILDING OF THE MEDICAL COLLEGE OF SOUTH CAROLINA WAS ERECTED IN 1826 ON THE CORNER OF QUEEN AND FRANKLIN STREETS

bought his colleague's interest in the practice, which was evidently an active one.

Dickson joined the Medical Society of South Carolina in 1819 and soon was active in its proceedings. He read several papers before the society and was elected its secretary in 1820. Earlier thoughts of establishing a medical school were beginning to take firmer shape in his mind; in 1821 actual plans began to mature after much discussion between Dickson, Henry R. Frost, and James Ramsay, practitioners in the city.

Frost, who, like Dickson, had been an apprentice under Dr. P. G. Prioleau, was a graduate of the University of Pennsylvania in 1816; Ramsay had been graduated from the same school in 1818.

These three decided to make a trial beginning by offering lectures in the public institutions of the city. When this program failed to evoke any interest of the College of Charleston in adding medical studies to its curriculum, the three crusaders determined to work out arrangements for obtaining a charter for an independent medical school. These voluntary lectures—one series by Dickson on physiology, another by Ramsay on surgery-were given, in 1822 to the 30-odd medical students who resided in the city. This was not the first attempt at providing instruction for the local medical students and, incidentally, other townspeople who might like to listen. In 1803, following the suggestion of Dr. David Ramsay, the Medical Society had appointed as lecturers two of its members, Dr. P. G. Prioleau and Dr. Benjamin B. Simons. A lengthy advertisement appeared in the newspapers to announce that lectures would begin on November 29 at the City Hall. How successful these were is unknown.

In July, 1809, Dr. Henry N. McEvoy had announced that he was prepared to give daily lectures on several branches of medicine and surgery. Again there is no record of the success or failure of the course. Finally, in 1822, Dickson and James Ramsay activated the suggestion made by David Ramsay in 1803.

Shortly before the time of the lectures (in 1822), Dr. Thomas Cooper, president of the South Carolina College in Columbia, had advocated establishing a medical school in the state. He had directed his suggestion to the Medical Licensing Board in Columbia and to the Medical Society in Charleston, which also functioned as an examining and licensing board.

Apparently the thought had not originated entirely with Cooper; the group of Charleston physicians that later made up the first faculty evidently "simultaneously entertained similar views."2 In any event, the Medical Society of South Carolina (essentially a Charleston group) appointed a committee to consider the subject of Dr. Cooper's oration. On November 22, 1822, they agreed to present to the legislature a memorial for the establishment of a medical school to be conducted on the general plan laid down by President Cooper but to be located in Charleston rather than in Columbia. The legislature refused this request, possibly because it included provision for an appropriation of money to support the operation of the proposed school.

The next year (February 1, 1823), "after making an eloquent and animated address to the Society [Medical Society of South Carolina] on the subject of establishing a Medical School in this State," Dr. Dickson offered a resolution that a medical school be established in Charleston under the auspices of the Society. Dickson then reported that "in November 1823, the Society presented to the Legislature a second petition, in which they asked merely for such an amendment of the original act of their incorporation as to constitute them a College of Physicians, with full power to confer degrees in Medicine-which prayer was granted."3

In the January following (1824), resolutions were entered into by the Society, which regarded the carrying into immediate operation the powers thus granted them; and in April, a Constitution was prepared for the proposed College, and all other necessary arrangements made, previous to the election of Professors, which took place in the same month.

But it was not the intention of the Society to employ any of its funds in providing for the operation of the School. The whole burden of the attendant expenses then fell, of necessity, upon the members of the Faculty. At their joint cost a building was erected upon ground, liberal-

² J. Moultrie, M.D. Memorial on the State of Medical Education in South Carolina; Delivered in the Representative Hall, December 5th, 1835. Charleston: Burges & Honour, 1836.

3 Introductory Lecture, delivered at the Commencement of the Second Session of the Medical College of South Carolina. Charleston: W. Riley, ly granted for the purpose by the City Council of Charleston, while the Professor of Anatomy procured, for himself, his Museum, and the Professor of Chemistry, the apparatus of his Laboratory. Their enterprize and exertions, it is well known, were not fruitless or unrewarded; but of this it is needless to treat.3

The original proposal to the legislature included provision for a school term of six months after three years of preliminary study-a somewhat more ambitious schedule than was prevalent in most medical schools of the period.

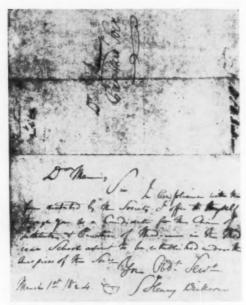
Seven College faculty members were



THE OLD CHARLESTON THEATRE ON THE CORNER OF BROAD AND NEW STREETS WAS CONVERTED TO THE USE OF THE NEW MEDICAL COLLEGE OF THE STATE OF SOUTH CAROLINA IN 1834

elected by the Medical Society: Dr. James Ramsay (surgery), Dr. H. R. Frost (materia medica), Dr. Thomas G. Prioleau (obstetrics), Dr. Edmund Ravenel (chemistry and pharmacy), Dr. Stephen Elliott (botany and natural history), Dr. J. E. Holbrook (anatomy), and Dr. Samuel Henry Dickson (institutes and practices). Doctor Prioleau was made dean "for the present year"; apparently the faculty members were to serve as dean in rotation. The course of lectures was planned to run for five months (November to April); two full courses (following three years of apprenticeship with a practitioner) were required for graduation. The faculty and the honorary members of the Medical Society composed the Board of Trustees.

The faculty requested and received from the city a 50×60 -foot piece of land adjacent to the Marine Hospital and close to the Alms House. The frame structure erected for a College could not have been much of a building, for in a very short time it was inadequate. The student group of 1825-26 comprised 81 members; in the next term it had grown to a total of 102.



Dickson's Application for His First Professorship (March 1, 1824)

Dickson was selected to make the introductory address at the beginning of the session of 1824. In 1825 he summarily reported:

This then is the present condition of the Medical College of South-Carolina, which it is desirable that all connected with it should understand. It derives its powers as a College entirely and absolutely from the Medical Society of South-Carolina, the signatures of whose President and Vice-President, are necessary to give authority to its Diplomas. It is altogether unendowed, all its original and current expenses having been borne by the six (sic) professional members of the Faculty. By their exertions a house has been built, and a class brought to-

gether. To their energy and perseverance, the State owes the existence of an Institution destined we hope to be alike honourable and useful to her increasing population.³

In 1825, because he was "threatened" with phthisis, Dickson traveled north in search of a more suitable climate. During the following year, when he had hemoptysis, he toured Europe to speed his recovery and also to collect for the medical school an anatomical cabinet of preparations from the best sources in France and Italy.

Still lacking sufficient funds, the faculty offered to furnish professional attendance at the municipal charitable institutions for a term of 20 years in return for an advance of \$15,000 for building purposes, thereby saving the city considerable money over the 20-year period, since the two then-current medical attendants were both on salaries. Although in 1826 this arrangement resulted in the building at the corner of Queen and Franklin Streets, which was to serve the College for many years, additional funds soon were needed. The legislature appropriated \$10,000, then \$7,000 in 1830, to assist the institution, which was then \$8,000 in debt.

During those early years Dickson was always active in the affairs of the College and eager to promote improvement in medical education. The Medical Society did not consider all his frequent proposals in this direction acceptable. The 1827 Minutes of the Society contain these remarks:

Medical Institutions should not be equal in all respects with those of Europe, and with the aim to produce this desirable object.... That a Committee be appointed to draw up a Circular, to be sent to the Trustees and faculty of the different Medical Colleges throughout the United States, proposing the extension of the term of Medical Studies, and such other alterations in the regulations of these Schools—the said Circular to be reported to the Society as early as possible, to be so altered or amended as the Society may deem fit. 4

⁴ Minutes of the Medical Society of South Carolina, 1827,

The circular that was prepared and sent to the medical colleges of the country received no recorded response.

In the same year he proposed that the term of lectures be extended to five months instead of the designated four months. He also emphasized the need for proper premedical education, advocating three years of preliminary study with a practitioner in addition to training in languages (Latin and French, at least), natural philosophy, and the "Moral Sciences" (Logic and Philosophy of the Mind).

All was not well with the internal affairs of the College. The honorary members of the Medical Society who served on the Board of Trustees had apparently displayed little interest in College affairs. In 1830 the Society rescinded its earlier action and created a Board of Trustees of seven members elected by the Society-not including the faculty. The faculty was opposed to this arrangement, which left the selection of faculty members to the Board and ultimately to the Society; hence the faculty prepared to elect its own successors. Active disagreement, which was precipitated by the occurrence of a vacancy in the list of professors, resulted in an abrupt split between the Society and those of its members who constituted the faculty. Maintaining that they had no obligation to the Medical Society, the faculty subsequently tried to secure a new charter from the state and to begin operation of a new and separate school. The new school, which was chartered in 1833 and opened in 1834 in the former Charleston Theater on the corner of Broad and New Streets, had 105 students compared with a handful remaining with the old College. This new college offered 22 hours of instruction a week for a term of four months.

Thus began a period of strife and recrimination that evoked numerous public statements and pamphlets that did little to elevate the dignity of the medical profession. The feeling was so bitter that one group obtained a charter for "The Medical Society of the State of South Carolina," a rival to the older Society. In time the new school

overshadowed the old one completely; in 1839 the Medical College of the State of South Carolina, with a board consisting of eleven non-medical trustees and the faculty, became possessor of the field and eventually acquired the original properties and building belonging to the first college, along with a debt of \$800.

Dickson, always the correct gentleman, had been the first of the faculty to resign



Samuel Henry Dickson (1798–1872)
(From the Library of the College of Physicians,
Philadelphia)

when the split occurred. At a special meeting the Society expressed itself officially:

Resolved, That the resignation of Dr. Dickson be accepted. Resolved, That whilst the Medical Society feel themselves constrained by a sense of duty similar to that which actuated the resignation, to accept the same, they yet feel happy in the expression of their entire satisfaction at the zealous and able manner in which Professor Dickson uniformly discharged the duties of his Chair.⁵

That Dickson was not without bitterness is shown in a reminiscent address of his, in 1833:

⁵ Minutes of Special Meeting of the Medical Society of South Carolina, July 7, 1832.

... Depending solely upon our own resources, we founded and put into regular operation a School of Medicine whose reputation throughout the Community was most gratifying to us and to our friends, and whose diploma was every where received upon the most unexceptionable footing. Of this proud recollectionamidst all obloquy and opposition-we cannot be deprived; neither by the illogical absurdity of the Bench,—nor by the hireling venom of the Bar, -nor by the unshrinking jealousy and envy of Professional rivals. In vain we have been assailed with all the weapons of malignant warfare; and the ultimate amount of advantage gained by the persevering hostility directed against us, has been merely to wrest from us for a time the results of the well-won munificence of the Legislators, and procure an unkind and partizan blow to be struck at us by the authorities of a city adorned and enriched by our labours.6

Dickson was dean of the new school in 1833–34 and again in 1839; he continued as Professor of the Institutes and Practices until 1847, when he moved to New York to assume the Chair of Practice at New York University. After three years there, he returned to Charleston to resume his old position and remained there until 1857, when he moved to Jefferson Medical College in Philadelphia after receiving a number of invitations to professorships in other schools.

In 1841 Dickson had outspokenly advocated appealing to the legislature for consistent support of the school, but nothing was accomplished by this proposed endeavor. In his annual report, he noted that there were 150 students in the school—chiefly South Carolinians, with representatives from seven other southern states. He also reported the discouraging fact that the legislature of the state had removed all requirements for safeguarding medical licensure.

In 1846 the national Medical Convention was called primarily to consider problems of education related to the rapid multiplication of medical colleges and their inadequate standards of instruction, which matters had long been under fire by such crusaders as

Daniel Drake, James Moultrie, Jr., and Dickson.

After the convention, addresses on the defects of current medical education were prepared and circulated by Dickson and others. In his introductory lecture at the Medical College in the fall of 1846, Dickson reported on the Convention and expounded on the necessity for adequate preliminary education, comparing the strict requirements of the French schools (four courses of lectures, premedical degrees, and repeated stringent examinations) with the lax standards of the schools of the United States. He remarked:

I have already drawn a sketch of our American mode of study-text books read exclusively or almost exclusively, cursorily, hastily; two half courses or one brief course and a half of lectures attended—listened to perhaps; a single dead body dissected under the eye of a Demonstrator, perhaps an arm only or a leg; a few surgical operations witnessed, such as may accidentally present themselves within the six months spent at the colleges; a few patients seen in the wards of a hospital at intervals of days, or it may be weeks. Our schools generally require three years of such study; but how seldom is even this rule fully complied with. The standard is so low, that any common industry may overleap it in half the time.7

To remedy such conditions, Dickson made the following proposals:

Those destitute of a liberal foundation, in classical studies, for the professional, scientific and technical attainments indispensably to be exacted should be required to pass five years at least, under the care and instruction of some established practitioner; and to attend three courses of chemical and anatomical lectures, dissecting, personally, at least two entire subjects; and two complete courses on all other branches taught in the schools. By the word complete here, I mean to define actual attendance throughout, which shall be proved (as in Paris) by frequent inscriptions on registers kept for the purpose; not the implied attendance now customary in our country, when a student may "take out his tickets" and go through the whole

⁶ Introductory Lecture, Delivered on the Eleventh of November, 1833, in the Medical College of the State of South Carolina. Charleston: J. S. Burges, 1833.

⁷ Introductory Lecture, Read at the Commencement of the Course, Monday, November 9th, 1846. Charleston: Walker & Burke, 1846.

business of the session by proxy; seeing the "Lions" of our cities—partaking of all their amusements—and visiting all their places of resort, whether creditable or discreditable, whether by day or by night—their theatres, circusses, race courses, night cellars and gambling houses.

The academical degree of Bachelor of Arts from any established university, should carry with it the privilege of abbreviating the course to three years study in an office, and two full series of lectures, with dissections. If the student has not enjoyed the advantage of a collegiate education, he may be allowed a similar privilege on producing a proper certificate from some competent and well known classical professor or teacher, of his having attained such literary proficiency as would entitle him to a degree in college. ⁷

The National Convention of 1847 made more progress in promoting improved educational efforts and resolved itself into the American Medical Association. Dickson was a delegate to the Convention and served as chairman of the Committee on Medical Sciences. In the latter part of 1847, he left Charleston for New York University, where he was to remain as professor of the Institutes and Practice for three years before returning to his old post at home. His colleagues in the Charleston faculty resolved that they desired

to express the sincere regret with which they separate from one, who was not only an original founder, but has so long been a distinguished ornament of this institution, and who has reflected honor on his native State, by the eminent ability with which he has contributed to elevate the character of the Medical Profession throughout the South....⁸

In 1851 Dickson was active in the American Medical Association; in 1852 he read a scientific paper before the Convention; in 1854 he served on a committee that was to consider how best to prevent the importation of disease by emigrants—a subject which fell well into the range of his often-expressed interest in preventive medicine. In 1858, at the age of 60 years, Dickson left Charleston to take a professorship at

⁸ Southern Journal of Medicine and Pharmacy, 2:610. Charleston: Burges, James & Paxton, 1847.

Jefferson Medical College.

In his native city he had pursued and enjoyed innumerable activities—cultural, social, and business. He was popular—an elegant orator on a variety of subjects and an impressive medical lecturer and writer. A contemporary Charlestonian, Dr. Middleton Michel, paid him a somewhat flowery but sincere tribute:

To speak of him is to speak of the Medical College. But to speak of him is also a privilege and a prompting of love. It is a happy thought that there are those among us still who will echo all that might be said of Carolina's distinguished son. The touching recollections of a bold, ingenuous, and sympathizing heart, soothingly affiliated with elegance of address and captivating manners, would alone declare the value everyone attached to his friendship and example: but the affluence of his mental resources, and the chastened harmonies of his elocutionary utterances gave him a predominance in colloquial discourse which commanded attention while it enlightened and always pleased. Worshiped literally among those who knew him best, courted by the ambitious young, caressed by the favors of the enlightened and influential; the seductiveness of the social circle where he reigned supreme, constituted for him naturally an attractive enjoyment. . . . 9

In the same address Michel said:

We have said that as the chief originator of our Medical College the name of Dickson becomes synonymous with the highest type of medical education in the South.... It was to Dickson's early and ambitious scheme, immediately after his graduation in Philadelphia, in 1819, made known to his friend, Dr. Isaac Motte Campbell, that we owe the Medical College in Charleston.

Dickson's reputation in Philadelphia was as outstanding as in Charleston. Dr. J. M. Da Costa, his successor at Jefferson, wrote that Dickson "retained to the last the grace of delivery and the flow of refined language which had made him at forty the most distinguished lecturer in his branch in the South." He went on to speak of Dickson's native refinement, his gentlemanly instincts

⁹ M. Michel. Address to the Medical Society, pp. 16–17. Charleston: Edward Perry & Co., 1889. his winning manners, and his high breeding. Da Costa indicated that Dickson was not a clinical teacher but depended on the eloquence of his lectures as a means of making a living; he did not actually practice in Philadelphia.

When the Civil War broke out, Jefferson lost 200 of its southern students, and Dickson lost in proportion. He became a poor man afflicted with bodily pain and mental anguish, despite the sympathy and comfort of his medical colleagues in Philadelphia, who continued to hold him in high regard. On March 31, 1872, Samuel Henry Dickson completed his noteworthy career.

Dickson's numerous writings include many articles in the then-current medical journals. In addition to a number of writings on various non-medical subjects and the rather long list in the Index Catalogue of the Surgeon General (First Series), these other medical publications should be noted.

- Introductory Lecture, Delivered at the Commencement of the Second Session of the Medical College of South Carolina. Charleston: Printed by W. Riley, 1826.
- Introductory Lecture, Delivered at the Commencement of the Fourth Session of the Medical College of South Carolina, November 1827. Charleston: Printed by W. Riley, 1828.

- Address before the South Carolina Society for the Promotion of Temperance, April 6th, 1830. Charleston: Observer Office Press.
- Introductory Lecture, Delivered on the Eleventh of November, 1833,... in the Medical College of the State of South Carolina. Charleston: Printed by J. S. Burges, 1833.
- Statements in Reply to Certain Publications from the Medical Society of South Carolina. Charleston: Printed by J. S. Burges, 1834.
- Essay on Mania A Potu, Forming One of the Course of Lectures on the Theory and Practice of Medicine. Charleston: Printed by A. E. Miller, 1836.
- On Dengue: Its History, Pathology, and Treatment. Philadelphia: Haswell, Barrington, & Haswell, 1839.
- Address Read to the Temperance Society of Asheville, Buncombe County, North Carolina, July, 1839. Published at the Office of the Greenville Mountaineer, 1840.
- Annual Report to the President and Board of Trustees of the Medical College of the State of South Carolina, with the Valedictory Address to the Class. Charleston: Printed by Burges & James, 1841.
- Introductory Lecture, Read at the Commencement of the Course, . . . Monday, November 9th, 1846. Charleston: Walker & Burke, Printers, 1846.

The Teacher in the Medical School*

MARTIN G. NETSKY, M.D.†

Section of Neurology and Department of Pathology of The Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, North Carolina

In fulfilment of its academic purposes as part of a university, the function of a medical school is to communicate and to advance knowledge. The communication of knowledge is teaching, and the advancement of knowledge is research. But the medical school also is a professional school, and hence it trains its students to care for patients. The three basic functions of the medical school, therefore, are teaching, research, and care of patients. The ideal faculty member, then, should have ability and interest in all three functions. But it is increasingly difficult to train such persons because of the enormous increase in specialized knowledge and the limitations of time. We are far from the era when Nathan Smith was the entire faculty of the medical school.

Some compromise with this ideal must therefore be made. I suggest that major capacities in teaching and one of the other basic functions should be required, or academic standards and the quality of the medical profession and its teachers will seriously decline. A man who only teaches should not be in a medical school because proper medical teaching is dependent on knowledge from research or patient care. A pure research worker should be in a research institute, not a school of medicine. A man who does only clinical practice should have an office in

town rather than the medical school. If this reasoning is acceptable, the faculty member should be a teacher and clinician or a teacher and research worker.

The clinical teacher derives inspiration from patients and students. A constant concern with care of patients supplies this teacher with knowledge, experience, and stimuli for more learning, and this learning can be transmitted to the student. The student who asks questions forces the teacher to prepare better and to think more deeply. In the same way, a reciprocal relation exists between research and teaching. In the search for new knowledge (which is research), the teacher-researcher obtains fresh ideas, new concepts of relations of facts, and better ways of teaching his knowledge. Indeed, the pressures exerted by the student often furnish approaches for research. Each of these basic functions should be delicately balanced in an academic setting. Allowance must be made for different emphases by persons with diverse talents or interests, but we are concerned here with an ideal. It is desirable, therefore, that the medical school teacher have either research or clinical ability. At the present time, research or clinical work often dominates the efforts of faculty members; teaching suffers thereby. I have asked numerous graduates of large medical schools "Who were your good medical school teachers (persons you remember or deem influential in your life)?" The usual reply is to name two or three of the scores of persons to whom they were exposed. I believe that

 Delivered at the Conference on Medical Education for Thai Scholars in The Medical Sciences Winston-Salem, North Carolina, June 10, 1959.

Most teachers agree that written and verbal presentations should differ because the media (visual and auditory) are different. Those persons who heard this talk may recognize the basic ideas, but the colloquialisms have been removed, some structures changed, and the concepts amplified.

† Professor of Neurology and Neuropathology.

¹ Many of the issues discussed are controversial. The promotion of controversy is intentional. If any reader agrees fully with my judgements, I have failed in my objectives.

this small number is the result of the dominance of research and clinical efforts at the expense of teaching. It is useful to ask why this has occurred.

The schoolteacher in our society is suspected of inadequacy for presumably better functions. "He who can, does. He who cannot, teaches."2 Various social forces may be acting to change this presumption. For example, the Sputnik impressed many people with the value of scientific education in creating new vistas for the future-or the destruction of mankind. Parents in the South suddenly became aware of the importance of the schools and teachers, when the entire scholastic system was threatened. The schoolteacher, nevertheless, is still thought inferior and is paid an extremely low salary, despite these and other national and international developments. Ambivalence is noted when the great teachers of humanity are considered. Barzun³ says, "When we speak of Socrates, Jesus, Buddha . . . the atmosphere somehow changes . . . august examples show that no limit can be set to the power of a teacher."

Teaching in medical schools suffers in part because of the suspicion of inadequacy of most teachers. The view is often expressed that the man interested in teaching lacks medical ability or has failed in patient care or research. In addition, some faculty members are dominated by private practice, leaving scant time for teaching except as incidental to the care of patients.

Teaching in the medical school also is subordinated because many thoughtful persons believe that research is the major function and that teaching is only secondary. Such individuals may view teaching as an undesirable duty, and thus they devote their efforts primarily to research. Even those persons who believe teaching is most important rarely spend most of their time in this work. Emphasis on research is further aggravated by the Brobdingnagian masses of

What motivates a person to teach? Some persons believe that teaching is an attempt to escape other responsibilities. This cannot be true of the devoted teacher, any more than abortionists represent the practicing physician. Dedicated teachers relish their work for many reasons. One person may enjoy sharing his ideas; another obtains pleasure from the stimulation of young minds or the acquisition of disciples; still another finds satisfaction in being looked up to; others enjoy the learning received when they teach or a chance to study the whole subject rather than the fragmentary approach of research.

A major difficulty is that these sources of enjoyment are intangible; they cannot easily be evaluated in the way that research reports can be numbered or assessed. No matter how much talk is expended on the importance of teaching, academic faculty recruitment is mainly the result of interest in research, is measured by research, and often is maintained by research. The word "research" has become magical for the laity, for the medical academician, and for the seeker of funds. How to stimulate interest in an academic career (for teaching and research)

money now available. The dollars for research result in decreased time in teaching, unless additional faculty members are added when research money is granted. These additions are seldom made. Who, then, will train the future research workers? Research, good or bad, can attract amounts of money far in excess of sums available for teaching. Partly because of this, the recruitment of faculty is based on research publications rather than on teaching ability. A man knows that he will be promoted, increase his salary, or achieve prestige by publishing papers rather than by teaching well. Indeed, in some schools he may believe that publication is essential for his future. "Publish or perish." It is sad to note that the number of papers is often used as a criterion of value rather than the wisdom expressed and that data reported without understanding may be respected more than intelligent comprehension of data.

² G. B. Shaw, Man and Superman: A Comedy and a Philosophy. New York: Brentano, 1914.

³ J. Barzun, Teacher in America. Boston: Little, Brown, 1945.

is a problem facing every medical school in the United States because positions often are not filled with lack of suitable candidates. The basic sciences especially suffer, but such clinical fields as surgery and psychiatry also require more persons.

With this background, it can be understood why teachers in medical schools have little or no training in teaching except by example and why many of the faculty are not interested in improving their methods of teaching. It should be understood that the effort to be a good teacher is comparable to the effort necessary to be a good research worker or a good clinician. Knowledge of a subject alone does not make a good teacher, although such information is an essential requirement. Members of the medical school faculty may spend years in special training for research or patient care but seldom spend time in learning to teach. Thoughtful persons improve their methods of teaching as time goes by, but their training is different than in the other basic functions. A clinician trains as a resident; a research man works in a laboratory; but the medical teacher enters teaching without equivalent training and is usually convinced that good teaching must result from his knowledge; the doubters are suspicious characters or mentally retarded or are smeared with "Deweyism" often by persons who have not read Dewey.

THE PROCESS OF TEACHING

The process of good teaching is so close to learning that "the teaching-learning process" has become a common expression. The major differences are that the ideal teacher has more knowledge in a particular area and a better understanding of the methods of

teaching-learning.

When a student learns a new principle, he becomes a different person. He knows more and therefore behaves differently. The teacher must deal with this continually changing individual and changing situation. Change is essential in all aspects of teachinglearning. Knowledge of every subject constantly increases, demanding that the teacher

be a student adding to his own information. The perception of the good teacher improves with time and thought, and his methods should change for the better as he acquires experience. Although it is commonplace to state that medical students should learn principles. I believe it is better to say that the student must learn to deal with a changing world, to evaluate critically, and to adjust to new situations, because even fundamental facts change. But, as the teacher grows older, he may become increasingly resistant to change; when he hardens, he loses value as a teacher in a school of graduate education.

The major implication of change is that both teacher and student should always improve their methods and knowledge. Wellsatisfied persons do not seek change. The good teacher must be dissatisfied with the existing situation and then must attempt to change it. He often reviews his methods, his students, his role in the objectives of the course and the school, as well as his knowledge of the subject.

The faculty member must be ready to learn from every teaching situation as part of his obligation to change. In dealing with the student, he should learn how to teach better but also more about the subject he is teaching. A significant test of the teacher is: Does he always learn from teaching? If an instructor repeats the same material year after year, he is not learning, and he is teaching badly.

How may he continually learn? The teacher has an opportunity to learn by careful preparation for lectures or other exercises. He learns by the questions and challenges of the student. He acquires new knowledge by repeated study of the old and recent literature, by research, and by later review of the problem. Learning-teaching never ends. If the teacher does not learn from teaching, he should review his methods or stop teaching.

A major problem of the teacher is to motivate the student to learn, that is, to change the student by arousing his interest. An uninterested student probably does not learn. Methods for motivating students deal largely with producing emotional reactions in the student. The ideal teacher evokes a desire to learn and creates an atmosphere of love for learning. Some teachers achieve this by their intense interest in the subject, combined with an ability to transmit this feeling to the student. Others use the force of their personality. Still others challenge or even antagonize the student. The expert teacher allows and brings forth the opinions of the student and makes discussion of the opinion a motivating force. On clinical rounds, for example, the student may be asked for his diagnosis. This diagnosis is questioned and analyzed. If properly handled, the student is then impelled to study further, even to show that his teacher is wrong! A medical student who reads or studies or thinks about a problem for any reason—to extend his knowledge, to defend his own opinion, or even to prove the teacher wrong- is a wellmotivated student who should be encouraged by every possible means. The best rounds I attended as a student induced a desire to study and a sense of excitement in me. I have hoped that my students sometimes have this feeling; if not, they miss an important part of their training.

The good teacher never loses an opportunity to teach. Medical students meet their instructors on many occasions, in clinics, wards, laboratories, halls, and homes. How far the teacher should go in dealing with extracurricular activities of students and their personal problems is a matter that has been little discussed. Every encounter can be a teaching situation. Even sharp disagreement among teachers can promote learning. When two instructors argue different sides of a question, the student learns that knowledge is not fixed or certain. Students enjoy these faculty discussions; hence they may be used to teach.

One commonly hears of "spoon feeding," referring to easy methods for the student to acquire knowledge. It is difficult for me to understand why this is bad. Learning should be pleasurable and even exciting. Students should be challenged when necessary, but

easy ways to learn should be encouraged. It is already too difficult to master a subject, and every help is needed.

Another fashionable catchword is "self-education." I have often thought that if this idea is carried to its logical extreme, we could do away with teachers! Self-educated men are admirable but are likely to exhibit major intellectual deficits. But the most astute comment on this general problem comes from Wilfred Trotter:

There is no aspiration more commonly expressed by conscientious teachers than that they should be able to give their pupils the power to think for themselves. This ambition seems so innocent and laudable that we are apt to let it pass without examining its merits as a practical proposition. If we do look at it closely in that light we cannot fail to notice certain unexpected features about it. One is that those who propose to confer this great gift of free thought often manifest but little of that activity themselves. A second is that when a pupil does by chance show some evidence of individual thinking the teacher himself is apt to seem a little disconcerted; but perhaps the oddest thing that is noticeable in these good intentions is a reticence about how they are to be carried out. Pupils are to be taught to think for themselves but how it is to be done is withheld from us. . . . We have the hint, then, that our general applause for thinking is not without an eye on what is thought; that when we urge the young to think for themselves we are inclined to be disappointed if they do not think like us.4

THE TOOLS OF TEACHING

The teacher may use lectures, demonstrations, laboratory exercises, recitations, reading assignments, clinics, ward rounds, discussions, and examinations. The ideal method is the tutorial system devised by Socrates. This technic in its best and most exacting form is used by one teacher and one student. The teacher asks questions and thereby guides the student toward truth but enables the student to find his own way. Note that the method makes use of differences of opinion. It requires more teachers

⁴ W. Trotter, The Collected Papers of Wilfred Trotter. London: Oxford University Press, 1941. than are usually available, hence other methods are necessary; but this Socratic ideal should not be forgotten. In clinical teaching, it is used, although modified, in training an intern or resident. Use of the other methods must be determined by the talents of the teacher and students, the needs of the subject and the course, the physical facilities, and the ratio of teachers to students. It is currently fashionable to denounce lectures because the student is passive. But this objection applies mainly to poor lecturers! All technics can be misused. A good lecture can be an interesting, active means of quickly conveying the approach of an experienced person to many students. It is certainly true that this experience must be reinforced by reading and thinking on the subject by the student, but a good lecturer inspires the student to ask questions and to study further.

The use of methods by which the student can be made more obviously active (laboratory exercises, recitations, etc.) are valuable, but any method becomes humdrum if the teacher does not constantly exercise his ingenuity to change the technic and challenge the pupil. Students have devilish ways of finding answers with minimal learning effort. The "active" methods can be made passive by a naïve teacher or one who re-

peats the same exercise.

One neglected teaching tool is the examination. Most faculty members use examinations only as an evaluating device and thus neglect an opportunity to teach by testing. There are many ways to do this, but the easiest and often neglected method is to review the examination with the student immediately after the test. The interest of the student is highest at this time. The teacher should encourage discussion of every part of the examination, including grades, and treat these discussions as an additional teaching opportunity. A more difficult way of teaching by examination is to ask questions requiring thought and evaluation rather than repetition of previously stated material. Clinicians may use case histories and require discussion of differential diagnosis; reason-

ing should be emphasized rather than the correct answer. Another useful device is to ask for the "pro" and "con" of a problem.

In this country a rising trend is noted toward the use of multiple-choice ("objective") examinations and away from essay ("subjective") questions. In general, more will be learned by the student from subjective than from objective testing. Essay examinations require the student to organize information, whereas objective tests deal more with recognition. Organized recall and thinking are necessities of medical or laboratory practice. Furthermore, the physician must learn to communicate his ideas to patients, colleagues, and pupils. Marking "X" on an answer sheet has no value in teaching communications. One may be able to read but unable to convey ideas. Objective tests, especially those used nationally, are not reviewed by students unless individuals memorize questions and collect the material in a "fraternity file." In research or clinical practice, we seldom encounter a problem with answers labelled a, b, c, d, and e. Proponents of objective tests frequently refer to the correlation of the results with other grades, standing in medical school, and so on; but these internal agreements bear no necessary relation to who becomes a good doctor. The objectivity of the test is deceptive and misleading. Guessing a "correct" answer is rewarded as much as knowing the answer and being able to reason about the problem. It has been shown⁵ that if different teachers create objective examinations and test the same persons, the results of the different tests will depend on the examiner. The objectivity is only in grading, but the setting of the examination is subjective! Objective grades are valuable for meats or cans of fruit, but I doubt whether the learning of a student is furthered by a numerical grade objectively delivered from a machine. Most graduate schools find "pass" or "fail" sufficient; is medical school not a graduate school? The difficulties of grading a subjec-

⁸ E. V. Pullias, Variability in Results from Newtype Achievement Tests. Durham, N.C.: Duke University Press, 1937.

tive test will be disregarded if the examination becomes a learning medium rather than a measuring instrument.

The personal tools of the teacher include enthusiasm, knowledge, and love—of teaching, the subject, and the pupils. The teacher should have ability to speak, to communicate interest and excitement, and to evoke thought and discussion. Teaching is difficult, its effects not easily measured, and its material rewards small. The teacher therefore needs an infinite supply of these intrinsic qualities.

EVALUATION OF TEACHING

Every teacher wants to know whether his teaching is genuinely effective, and this evaluation is most difficult. The better the medical teacher, the better the doctors trained by him; but we have almost no methods to determine who is a "good doctor." Various approaches have been used in assessment. Certain abilities can be tested at different times in medical school to determine changes in the student. Students of different teachers may be compared. Objective examinations lend a mathematical quality to this assessment, but the value of the person to society is not determined. Most of us have a lurking fear that high grades are not necessarily a measure of such value, and we all know students with poor grades who have done well after medical school.

The students can be asked about thei teachers and valuable information obtained

but they are not able to compare teachers in other schools, and their opinions frequently change after leaving medical school. Good teachers are often well liked, but popularity may be related to factors other than ability to teach.

Value to society may be assessed in several ways. How many students of a given teacher or school go into a certified specialty, academic work, deanships, private practice, or organized medicine? These figures could be determined and might be helpful. The difficulties are that the comparative values of these influential positions are themselves difficult to assess; quality is not judged (there are good specialists and bad specialists); and much time under controlled conditions must elapse before valid conclusions can be drawn. Remember also that some of the best teachers have had the most spectacular failures among their students. Highet cites Jesus and Judas Iscariot, Socrates and Alcibiades, Seneca and Nero, and tries to explain what may go wrong.

The final measure of a teacher is the influence he has on the life of his student. The fruitful ideas implanted, the studious attitudes inculcated, the critical thinking incited are marks that the teacher may leave on his student. Most teachers cannot know what they have done in these terms. The major rewards of teaching reside within the mind of the teacher. A burning desire to teach is imperative.

⁶ G. Highet, The Art of Teaching. New York: Knopf, 1950.

The Jacksonville Experiment in Graduate Medical Education*

MAX MICHAEL, Jr., M.D.†

Through the years medical schools have found it necessary to break with tradition and with established, and often comfortable, patterns of undergraduate medical education. This is true of curriculum organization, of educational content, and of teaching methods. At the present time a number of intriguing experiments in medical education, supported in the main by foundation grants, are in progress. It is not appropriate for me, at this time, to discuss the reasons for these changes or the direction of the experiments: rather, I propose to discuss an experiment concerned with a different level of medical education.

A small group of physicians in Jacksonville recognized early the problems inherent in several small hospitals attempting to conduct fully independent graduate programs for interns and residents. They recognized also that Jacksonville must become a true medical center to complete the commercial, industrial, and cultural growth visualized for the city and county. These physicians devoted a number of years in planning for the strengthening of established hospitals and for their graduate training programs, to the end that a co-ordinated program might be established. Their plans culminated with the formation, in July, 1958, of Jacksonville Hospitals Educational Program, incorporated under the laws of the state of Florida, and with the employment of a full-time director. The administration of the program assures the representation of each of the hospital units, in that a member of the medical staff, the administrator, and a member of the governing board from each hospital comprise the Board of Directors. The chairman of the Educational Committee of the Duval County Medical Society and the Director of Medical Education at Baptist Memorial Hospital are ex officio members. The member hospitals are: Baptist Memorial, a 272-bed private institution; Brewster, a 124-bed institution for private Negro patients: Duval Medical Center, a 335-bed county hospital which handles most of the county indigent patients; Hope Haven, a 90-bed hospital for crippled children; St. Luke's, a 210-bed private hospital; and St. Vincent's, a 360-bed private hos-

Each hospital contributes to the financial support of the organization. An annual base assessment of \$1,000 is supplemented by a sliding scale of charges based on the number of patients admitted. These funds have been supplemented by a research grant from a large philanthropic organization and by contributions from local citizens.

Although the executive director officially works through a committee composed of the chairmen of the Educational Committee in each hospital, in actual practice the procedure is much more informal and more workable. Frequent conferences with the chiefs of service and with those genuinely interested in residency training is the way that most problems are attacked. There is also ready access to all records, committee meetings, conferences, and all features, both

^{*} Presented at the annual meeting of the Association of American Medical Colleges, Chicago, Illinois, November 3, 1959. Supported in part by a research grant from the John A. Hartford Foundation.

[†] Executive Director, Jacksonville Hospitals Educational Program, Inc., and Clinical Professor of Medicine, University of Florida College of Medicine.

medical and administrative, of each institution.

The first year of operation has been devoted to study, exploration, and education with the following lines of attack being pursued: (1) assessing the facilities, the possible faculty organization, the teaching potentials of the potential faculty, and the special educational potentials inherent in each institution; (2) developing a spirit of common interest among hospitals and physicians; (3) breaking down the natural "institutional parochialism" of the individual hospitals; (4) determining the defects and seeking means to meet those which would otherwise detract from an accomplished program.

An evaluation of accomplishments to date will furnish some insight into the modus operandi. One first looks at the intangible items and finds in these most significant achievements. Foremost perhaps would be the fact that six hospitals, with their natural competitiveness, jealousies, and well-understood provincialism, could unite in such a common endeavor. To me, the most gratifying accomplishment in the first year of functioning has been the realization on the part of most of the physicians in the community of what such an undertaking entails. Many of them felt that the simple rotation of residents from one hospital to another was all that need be accomplished. For the most part, they now realize that the keynote to success in any training program is depthdepth furnished by better teaching, improved conferences, increased research activities, better library facilities, and better co-ordination of all activities. Most also realize now that such a program will demand more of their time for teaching, for clinical responsibilities, for administrative duties, and for general participation.

It is difficult for the busy practitioner to reckon with the fact that his teaching responsibilities must be an integral part of his crowded schedule. His commitment for ward rounds, conferences, and other teaching exercises must be met just as rigidly as are his visits to his patients and his appearance in the operating room. Many of our active group sense this and practice it, but the process of education along these lines will be painful and slow.

There have been certain concrete achievements which can be enumerated here.

Library.—A committee composed of representatives from each hospital has worked out a basic list of texts and journals which will be purchased by each hospital. This is amplified with further material depending upon the number and types of residencies offered. Over and above this, a supplemental list of books pertaining to the various specialties has been provided. Similarly, basic lists of journals have been drawn up. These supplemental journals and texts are purchased in rotation by the hospitals so that at least one subscription and one text from the more esoteric list will be available in the community. Each hospital librarian has a consolidated list of books and journals available in all the libraries. By utilizing a prompt delivery service, it is possible to obtain material from any hospital library with dispatch. No more than two sets of a journal will be bound, thus conserving library funds and badly needed space. Co-operating in this program is the library of the State Board of Health, which is quite extensive and supplements exceedingly well the material available in the hospitals.

Animal laboratory.—For each institution to have its own laboratory for studies involving animals would be costly. A central laboratory has been constructed to serve all hospitals. This will provide modern facilities for investigations requiring the use of animals and for the training of residents in the various fields of surgery. Of interest is the wholehearted support of the Jacksonville veterinarians in the selection, postoperative care, and boarding of animals.

Research.—Research is essential for a well-rounded program. Participation should involve attending staff as well as house staff. Much research in the nature of record study—perhaps more correctly called "compilation of data"—can be accomplished. Essential for this are accurate observations and accurate recording of clinical information—

often faulty, particularly in a private institution. To make such information available for these studies, this deficit must be corrected. It requires education, but it can be accomplished.

One of the private institutions has recently completed a research laboratory. In another private institution, active research programs have centered around the pathology department. The pathologist, through his interest in investigative medicine, has been able to interest and solicit the active participation of several physicians in basic research problems. His research program has been remarkably unfettered by the customary administrative road blocks—the hospital co-operation is heart-warming.

Research laboratories are under construction in the Jacksonville Blood Bank, with funds for technical help being provided by community health agencies. These facilities will at first be concerned with cardiac catheterization, open-heart surgery, and pulmonary-function studies. Rapid expansion into other fields with more participation by house staff and attending staff is anticipated. For the past year the Veterans Administration laboratory for research in sarcoidosis has operated in the Blood Bank.

Basic science seminars.—These seminars, conducted by investigators from various medical schools, are held at frequent intervals. These informal discussions are rotated through the hospitals and are attended by house-staff members from all institutions. These, of course, are planned only as a stimulus for further "basic thinking." The "one-shot" discussion on phagocytosis, for example, is utterly worthless unless followed up by discussion of the problem as it pertains to patients under study. Those charged with the major aspects of teaching programs must keep abreast of current developments. To aid in this, "current status" reports to be given by investigators in various fields are planned. Visiting professorships in the several clinical specialties have been established. The visitor will spend several days in residence, his major time being devoted to discussion, seminars, and ward-round teaching. The multiple lectureships will be shunned. Lectures, seminars, visiting professorships, etc., alone cannot supply all the teaching for any residency program. It can, however, serve as a stimulus for more learning and, more importantly, can be of immeasurable aid for the visiting staff. Their participation is essential, for it is part of their continuing education in preparation for teaching.

A television circuit.—A television circuit which will link all hospitals and, in turn, be linked to the University of Florida is in the active planning stage. The ability to televise conferences among hospitals will be economical of time for both house staff and attending staff. The reception of material from Gainesville will be a further teaching aid. Perhaps the major contribution of television will be the improving of the conferences, both in context and in manner of presentation. One does not merely roll a camera in and "shoot." Much careful planning will have to go into the preparation of each conference.

The University of Florida College of Medicine is 65 miles away in Gainesville. The co-operation, advice, and sympathetic understanding of the officials in the Medical School have been invaluable in the organization and running of our program. Their faculty participates in our various "guest performances." The entire third-year class spent 10 days in Jacksonville in the fall of 1958 for work in physical diagnosis. At present, electives in obstetrics and gynecology and in medicine are offered in Jacksonville for the fourth-year class. It is healthy for Jacksonville that over half the class are spending from 6 to 12 weeks in the community for this work. How firm a working arrangement there will be in the future between Gainesville and Jacksonville as concerns students and house staff is unpredictable. We are both too new at the moment for any firm commitments.

The affiliation of residents and interns between hospitals is under careful study. Any affiliation must be for the benefit of the man's training and not for serving the needs of a particular service. Except for possibly some affiliation in clinics or in special fields, little rotation is visualized for the already rotating interns.

An affiliated exchange of residents between hospitals is in the planning stage, although some programs are in existence. The Duval Medical Center, with its large indigent population and vast amount of clinical material, affords the resident opportunity for more responsibility and more extensive clinical material for further study and investigation. On the other hand, the private hospital affords him the opportunity for study of earlier stages of disease and for becoming acquainted with the problems of the private patient—be they financial, sociological, or psychological. Exchange of residents between hospitals is to be accomplished in an orderly, prearranged fashion. Certain "ground rules" have been established. For example, a resident cannot be recalled to his parent institution because of a manpower shortage. At the present time, residents in medicine from the private institutions attend the general medical and specialty clinics at the Duval Medical Center. Some hospitals may have partial residencies and, in time, all may be completely integrated.

How many true JHEP (Jacksonville Hospitals Educational Program) residencies, i.e., those with JHEP as the "parent," there will be is uncertain. At present, programs in pediatrics and orthopedics are working toward this goal. Among the many advantages of this type of program is the continuity given to it through the program director, who, in turn, is responsible to JHEP through the executive director. The major obstacle to be overcome in such an endeavor is the fear on the part of the individual institution of losing its identity. The realization that a better-trained house staff for each institution will result from such exchanges is the basis for "selling" such a program.

Problems have arisen in this over-all program and will continue to arise in the future. Some of these may be categorized as follows:

The major ones have been concerned with

the "faculty," that is the private physicians in the community. Many have felt that, to run a residency, one needs only to make assignments, plan rotations between hospitals, and "let Joe do it." Some of this deluded thinking is changing, and many of the visiting men now realize that making ward rounds means making ward rounds, not sticking one's nose in the ward and asking "Is everything all right?"

A big problem presented by any voluntary faculty in my experience has been that concerned with the techniques and methods of teaching. The private physician is often insecure in his approach to teaching. He frequently shrugs off presentations with an allknowing grunt or observes an austere silence. Occasionally there is a dissertation on "now in my practice. . . ." He needs to have the amount of humility which will permit the luxury of saying "I don't know"-a stimulating challenge to both himself and the house staff to fill in this gap in knowledge. This maneuver does not make him "lose face"—indeed, it raises him in stature. More quizzing of the house staff and more critical review of records, of presentation, and of actual work will be appreciated by the house staff and will result in a bettertrained man.

Parenthetically, it might be added that lack of teaching ability is not the sole possession of the voluntary faculty. Regardless of careful evaluation of the candidates for professorial rank, that circle has its share of ineffective teachers. It is logical to ask what we are doing to improve the teaching of our teachers. Critical appraisal of conferences, rounds, and methods of teaching is given freely and usually gratefully accepted. We plan a series of group sessions on teaching, with internists being the first. This may prove to be only group therapy or even a complete failure, but it could separate the potential workers from the drones.

Those charged with the over-all program of JHEP are entirely aware of all things that a "medical center" means. They realize that in the three major facets there are many lacks, but also many things on the plus side.

solution.

(1) Teaching has been discussed; (2) research and clinical investigation have been touched upon; (3) there remains the development in the community of all the accepted procedures in the management of patients. One hospital has an artificial kidney; another has a cardiac catheterization team and is instituting open-heart surgery; yet another has facilities for pulmonary studies; the afore-mentioned blood gas laboratory will serve as the nucleus for development of biochemical and other studies, usually reserved for the university center.

Many administrative problems loom ahead. For example, when a co-ordinated program of a residency is worked out, how is pay regulated when one hospital furnishes room and board and another does not have facilities for these? Such matters are in the hands of the administrators, who promise to come to us with a fair and equitable

It might be asked Why a residency program in any non-university hospital where the depth of manpower and facilities can in no way touch that of the university? One can reply that a good residency program with good house staff raises the level of medical care in the community-of this there can be no argument. Over and above this, however, and being perhaps a bit idealistic, it permits the practicing physician, who participates actively, the luxury of continuing postgraduate medical education-an experience that is a subtle day-to-day affair rather

than the traditional five-day "cram" post-

graduate lecture course.

But what of the resident? Can he receive the same type of training offered in the university medical center? The answer to this is Yes. All one needs do is provide those features of graduate training found in the university hospital. I am sure that a survey of university hospital training programs will indicate that each of them has certain lacks inherent in its organization, in its location, and in the interests of its faculty. A former dean who has surveyed many medical schools assures me of this fact-but I do not need such assuring.

Those charged with the administration of a resident program, and particularly of one in a non-university hospital, must fully appreciate the fact that the resident is not to be exploited, nor is he merely serving an apprenticeship or proctorship, as was the custom in days past. The residency is a vital part of his training and is, indeed, an extension of his medical school days-true graduate medical education.

I have attempted to present some of the features of an experimental program, the purpose of which is to co-ordinate and improve graduate medical education in six non-university community hospitals. Its ultimate success cannot be measured on a bar graph of the number of house-staff positions filled-quality is difficult to plot. Its success must be measured in a more subtle fashion, for how does one graph improved medical care and quality of graduate medical education?

The Honor System in United States and Canadian Medical Schools*

RALPH D. TANZ and ROSE T. TANZ

Department of Physiology, School of Medicine, Western Reserve University, Cleveland, Ohio

In an attempt to ascertain the feasibility of initiating an honor system at the Medical Units of the University of Tennessee, a questionnaire was sent to administrative officials at 82 medical schools in the United States and 12 in Canada. Table 1 shows the

TABLE 1

RESPONSE TO QUESTIONNAIRE AND NUMBER OF SCHOOLS HAVING AN HONOR SYSTEM

	MEDICAL SCHOOLS			
	United States		Canada	
		Per		Per
	No.	cent*	No.	cent*
Schools replying to question-				
naire	80	97.6	11	91.7
Schools not re- plying to ques-				
tionnaire	2	2.4	1	8.3
	_		or books	
Total	82	100	12	100
	-		-	
Schools having an honor sys- tem Schools without	34	42.5	• •	
an honor sys- tem	45	56.2	11	100
Not pertinent (Yale)	1	1.3		
	_	400		400
Total	80	100	11	100

^{*} Per cent in terms of the total number in each category.

response received to the questionnaire and the division between those medical schools that have an honor system and those that do not.

* The information for this article was gathered by Ralph D. Tanz while a member of the Department of Pharmacology at the University of Tennessee Medical Units, Memphis.

¹ The questionnaire was approved by the Executive Council of the Association of American Medical Colleges.

Out of curiosity initiated by the comment from the Dean of one New York City medical school (see "Discussion"), the per cent of the schools having an honor system based on their geographical location was tabulated. The results of this tabulation are illustrated in Chart 1 and show that 70 per cent of the southern medical schools and 50 per cent of those in the Far West have an honor system. However, honor systems are in the minority in the Midwest (38 per cent), Northeast (29 per cent), and the so-called Border States (25 per cent), including Maryland, West Virginia, Kentucky, and Oklahoma.

Since no responding medical school in Canada has an honor system, the results tabulated in Tables 2–5 pertain only to the United States.

One of the reasons this study was initiated was to ascertain the success of the honor system. It was therefore of great interest to find that 94 per cent of the administrative officials whose schools have an honor system stated that it was an unquestioned success. In one school the honor system has been in existence for only a year, and so it is "too early to tell" whether or not it will be a success.

The results shown in Table 3 on the composition of honor councils are a little difficult to interpret because different conditions prevail at various medical schools. There are, for instance, several two-year medical schools; in addition, there are some instances where the medical school is but one school at a university and the honor council may have representatives from all

the schools at that university. As a consequence, the authors feel that the number of student and faculty members comprising a particular honor council and their terms of office are not significant. Obviously, these will depend on the aforementioned conditions present at each school. However, it is significant that a majority (88 per cent) of the schools elect their student representatives and that 77 per cent of the schools have no faculty members on their honor council. These results will be discussed later, but for the present it apparently indicates that a majority of the schools having an honor system find it preferable to have the students in complete charge. This is also borne out by the results shown in Table 4 pertaining to how the chairmen of various honor councils are selected.

The results tabulated in Table 4 show that in 27 of the 28 medical schools replying to this question, the Chairman of the Honor Council is an elected student. Again this is illustrative of the fact that in a successful

TABLE 2
ORGANIZATIONAL FEATURES AND SUCCESS
OF HONOR SYSTEMS

OI MONOR DIVIDE		
Schools having honor systems (United States only)	No.	Per cent*
Compulsory for all students	31	91.2
Freshman class votes	3	8.8
Total	34	100
Organization exists to administer honor system	31	91.2
No organization to administer honor system	2	5.9
Special committee for each case	1	2.9
Total	34	100
Honor system is a success	32	94.1
"too early to tell"†	1	2.9
Unanswered	1	2.9
Total	34	100
Unanswered	_	

* Per cent in terms of the total number in each category.

† Instituted in 1958.

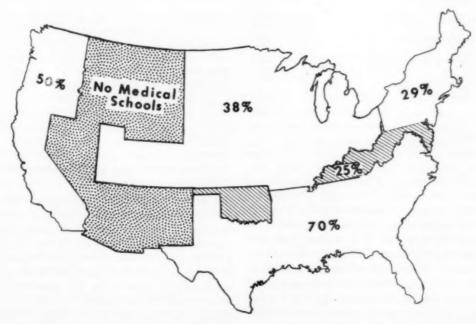


CHART 1.—Geographical distribution showing the per cent of those medical schools in each area having an honor system.

honor system most of the authority for administering the system resides with the students themselves. Table 5, however, shows that in most instances some member(s) of the administration or faculty must approve of any punitive action recommended by the Honor Council against a student found guilty of an honor-code violation.

TABLE 3

Composition of Honor Councils

Composition of honor councils	No. of schools	Per cent*
Number of student members:	8	31
4-6	0	31
7–9	13	50
10-13	5	19
Student members elected†	28	88
Student members appointed \dagger .	4	12
Student members: Change each year	22	85
Serve 2 years	3	12
Serve 4 years	1	3
No faculty members	24	77
Faculty members	7	23
Number of faculty members:		
1	2	29
2	4	57
6	1	14

* Per cent in terms of the total number replying to each category.

† In two schools, student members are elected and appointed.

On the surface, the fact that some administrative official or faculty member(s) must approve recommendations for punitive action may seem undemocratic. In practice, however, it is known that students are often more severe on their fellow students than seems warranted. Moreover, all reasonable forms of self-government usually possess some method of checks and balances, and the fact that recommendations for punitive action are usually sent elsewhere for approval should not be con-

strued as an unreasonable infringement on self-government.

Table 6, the final table, pertains to those schools in the United States and Canada which do not have an honor system. In the United States eight of the 45 medical schools that do not now have an honor system had one in the past. It was important, therefore, to ascertain why they were

TABLE 4
SELECTION OF THE CHAIRMAN OF
THE HONOR COUNCIL

Chairman of Honor Council is:	No. of schools	Per cent*
Elected from Honor Council President of student medical	8	29
society	6	21
An elected Senior student	5	18
Previous year's Junior member	4	14
President of Senior class	3	11
An elected student	. 1	3.5
Dean of Students	1	3.5
	-	
Total	28	100

*Per cent in terms of the total number replying to this question.

TABLE 5
FINAL APPROVAL OF HONOR COUNCIL'S
RECOMMENDATIONS

Final decision must be approved by:	No. of schools	Per cent*
The faculty	14	47
The Dean or Associate Dean	8	27
Honor Council only	4	13
Faculty, Dean, and Honor Coun-		
cil	2	7
Executive Committee and Dean	1	3
President of college	1	3
	-	-
Total	30	100

*Per cent in terms of the total number replying to this question.

discontinued. In four of these eight schools, entering students had the option of electing an honor system, but, for unknown reasons, they no longer voted for it. In two other schools where an honor system had existed in the past, the reasons for discontinuing it could not be recalled by the present administration. One administrative official admitted that he did not favor the honor system and therefore eliminated it when he became dean, and the eighth medical school

official noted that at his particular institution the system broke down. Apparently, only in this last instance was the honor system conclusively shown to be unworkable!

DISCUSSION

There are numerous facets to be considered in discussing an honor system. Initially, one should attempt to ascertain whether an honor system at a medical school is desirable. Since the existence of an honor system expresses a way of thinking, theoretically it should enhance a person's actions at all times. Therefore, it would seem logical that medical students might have a better opportunity to develop certain desirable qualities, including an awareness of the concepts of honor and integrity. Certainly their conduct in relation to their medical education, as well as after medical school, should be guided by such values. An honor system would therefore seem to be a highly desirable facet of medical education.

The consensus also made it clear that the success of such a system is primarily dependent upon the part played by the students themselves in initiating, developing, and working under the honor system. Perhaps the most important feature of an honor system is that it be the students', not the faculty's and that the system be accepted and operated by the students. In this regard it was also felt that a most important aspect is that the faculty respect the recommendations of the honor committee.

Although it is felt that an effective honor system should initially originate with the students themselves, many of the administrators stated that the school can foster the development of an honor system by having its faculty provide the necessary leadership and education. In this manner the students involved can perhaps be motivated to adopt such a system, but the actual development should probably rest with the students themselves.

However, it must be pointed out that several schools have been unsuccessful in their attempts to institute an honor system by this method. Two examples are Nebraska and L.S.U. (Louisiana State University). At Nebraska the students were unable to reach agreement that an honor system should be instituted. This also applied to the situation at L.S.U., where the student body recently rejected by ballot an honor system plan, even though it had been approved by the Student Council and Faculty. (At L.S.U. the principal objection to the plan was that a student accused of violating the code would not be given the opportunity of facing his accusers.)

TABLE 6 BREAKDOWN OF UNITED STATES AND CANADIAN SCHOOLS NOT HAVING AN HONOR SYSTEM

	MEDICAL SCHOOLS				
SCHOOLS NOT	United States		C	Canada	
HAVING AN		Per		Per	
HONOR SYSTEM	No.	cent*	No.	cent*	
Have had an hon- or system in the					
past	8	17.8			
Have never had an					
honor system	37	82.2	11	100	
			-		
Total	45	100	11	100	
	-		-		
Considering an honor system in the near future:					
Yes	9	20.0			
Maybe	9	20.0	2	18.2	
No	24	53.3	8	72.7	
Unanswered	3	6.7	1	9.1	
Totai	45	100	11	100	

^{*} Per cent in terms of the total number in each category.

The successful institution of an honor system is dependent on several factors other than those previously mentioned, such as the guidance and leadership that the Faculty can offer. Undoubtedly, a factor of importance is the social background of the students that a particular school attracts. This was thought to be of primary importance by administrative officials at two New York City medical schools. For instance, one man wrote that he had obtained his medical degree from a southern school which had an honor system that worked, apparently because "those students were Southerners with personal and family pride." He went on to note that, since his present students came from such "varied" backgrounds, he doubted the advisability of an honor system in New York City. From another New York City medical school came the comment that the "system for conducting examinations should be appropriate to the local situation. If the calibre of the students or extreme competition for grades gives strong motivation for cheating, then a strict system of control at examinations would seem appropriate." (Yet not ten miles away there is a medical school that has had a very successful honor system for many years.) Several others noted that successfully proctored examinations remove the temptation to cheat, and it was their belief that honor cannot be related to a system—rather, it is an individual problem.

The question arises as to whether or not an individual can be educated or trained to be honorable. In this regard Dr. Jason, Dean of the College of Medicine at Howard commented that "thisis an area in which by example more than by precept we have a tremendous responsibility, which we have not discharged well enough. A co-operative effort between students and faculty in the direction of an honor system and having the ingredients of humanity, honesty and dedication deserves the very best opportunity possible to succeed." But the opinion was also stated that, although the honor system was an excellent thing in principle, it must be a part of a truly graduate educational program and that the responsibility given the student must be much greater than simply allowing him to monitor his own examinations. Oddly, one New England medical administrator commented that, because "a graduate school is a serious endeavor, honor systems are better relegated to secondary schools or liberal arts colleges situated in the country and run in a leisurely manner where there is plenty of time and enthusiasm for running an honor system really well."

Another question to be answered in the initiation of an honor system is the scope of such a system. As examples, at the medical

schools of the University of South Carolina and Union College (Albany), the honor system pertains solely to examinations. At the University of Texas it is limited to examinations plus any other phase of a student's academic life. At Ohio State, Bowman Gray, the University of Pennsylvania, and Mississippi it encompasses not only examinations but all student activities.

Many institutions publish a rather extensive Honor Code booklet. Near the front of these booklets the honor system is usually defined. Examples of these definitions are given below.

1. University of Pennsylvania.—"The Honor System is founded on the principle that responsibility for ethical conduct rests with the student himself. This system depends upon the personal integrity of each student and upon each student insisting, by means placed at his disposal, that all other students abide by the Honor System."

2. Medical College of Virginia.—"The Honor System is a system of self-government whereby the students themselves eliminate from their body those who fail to deport themselves as honorable men or women in all college matters."

3. University of Michigan.—"The Honor System as applied to examinations is merely one expression of the high degree of personal and professional integrity which is so vitally essential for all those in the medical profession." Also that "an integral part of the honor system is that there shall be no proctoring by the faculty during an examination. The incidental presence of an instructor for the purpose of interpreting an examination or assisting in its administration shall not be considered proctoring."

4. University of Texas.—"The Honor System is the means by which the protection of the examination system and a greater responsibility for the general conduct of student affairs is assumed by the Student Body."

One of the most appealing explanations of the philosophy behind their honor system is the following statement handed out to the students at Albany:

... The lack of an expressed faith in the integrity of the student that is present in the proctor system is certainly out of place in an institution which is devoted to the training of men who will soon hold far greater trusts in their hands than whether or not they will represent their own work on an exercise in graduate school. It is then proper that an alternative to this system be examined. To swing the pendulum in the other direction one might simply eliminate all supervision in the belief that all men in our position are honest. Experience with this idea has shown that this ideal is not to be justified in practice; not only in this, the realm of examinations, but in other realms as well, as we are all aware.

The final concern regarding the initiation of an honor system pertains to the willingness on the part of students to report observed violations. It is the authors' personal belief that if the philosophy behind an honor system is adequately explained to the students, they will more willingly report a violation.

The Honor Code from the Medical College of Virginia states: "It is important that everyone recognize this duty of protecting the honor system and the Student Body. Anyone who sees a fellow-student in suspicious circumstances and fails to investigate the matter is himself guilty of a breach of honor."

Upon registration at a number of medical schools, students must signify in writing that they have read the honor code and that they agree to abide by the rules during their connection with the school. Many schools require that their students renew their pledge after every major examination by signing two separate pledges:

I have neither given nor received aid on this examination.

I have seen no one give or receive aid on this examination.

Signed

The inclusion of this second pledge apparently implies that the same personal integrity which prevents the student from being dishonest also compels him to report any Honor Code violation on the part of others. As so aptly stated in the University of Michigan pamphlet, "the responsibility of the individual student in reporting violations of the honor system parallels the responsibility of the individual physician in maintaining high medical standards by his persistent effort to eliminate unethical practices."

There are several schools which function under no formal honor system, such as Rochester and Western Reserve. They do not have an honor system in the sense of any written or adopted code. Their honor systems are apparently based on the assumption that each student will automatically conduct himself according to the honorable standards expected of a physician. As several others have noted, it is rather difficult to instil honor by legislation. And it is apparently this aspect of the problem that has prevented the institution of any formal honor system at the Harvard Medical School, according to Dr. J. W. Gardella, Assistant Dean.

SUMMARY

The response to a questionnaire sent to 82 medical schools in the United States and 12 in Canada, showed that 34 (43 per cent) of those schools in the United States have an honor system but that there are none in Canada. Of these 34 medical schools having an honor system, it is compulsory in 31 and voted upon by the Freshman class in three others. Ninety per cent of these 34 schools have a student or student-faculty council setup to administer the honor system. In several medical schools there is no formal or written honor code. A geographical distribution shows that a majority of the schools in the South and 50 per cent of those on the West Coast have an honor system. Forty per cent of schools in the United States and 18 per cent in Canada which do not have an honor system indicated that they are either actively studying or considering the possibility of initiating one, which would indicate that they are not entirely happy with their present situation. Furthermore, none of the

schools presently operating under an honor system signified that they were considering eliminating it.

A number of administrative officials voiced the opinion that a truly successful honor system is dependent upon the students' initiating, developing, and working under it. It was also the majority opinion that such a system worked best if the faculty had little or nothing to do with it.

The desirability of initiating an honor system is discussed and is perhaps best summed up by the following statement taken from the Honor Code Handbook of the College of Medicine at Ohio State, to wit: "The responsibility for professional integrity is not automatically created with the acquisition of the license to practice; strict honesty should begin as an inborn trait and be nurtured during the period of education for professional service." It would appear that the opportunity afforded a medical student to work under an honor system is to be heartily recommended as constituting an important part of his medical education.

MEDICAL EDUCATION FORUM

Editorial

NEW CHALLENGES TO MEDICAL EDUCATION

Medical education today is challenged by many new and rapidly growing scientific, social, and economic forces that bear directly on the activities of the medical and allied professions, the universities, the hospitals, industry, labor, and all levels of government. The American people are convinced that adequate health services are essential in our society and are determined that "medical security" in some form shall be made available to the entire population. They are beginning to make constructive use of their wealth through voluntary, as well as governmental, channels to attain the fullest possible measure of benefits. These beginnings, although still far from meeting the current needs, are illustrated by the large federal appropriations through the National Institutes of Health, the National Science Foundation, the Hill-Burton program and the annual voluntary contributions of over two billion dollars for health and welfare causes. The public is turning to the educational institutions and health professions to propose and guide such programs.

Valuable as they are, the sudden large increases in funds for investigation from a variety of sources outside the medical schools have led to a partial separation from the educational institutions of the control, direction, and utilization of research personnel. One result of such outside financial support, usually temporary, is to create a group of workers with little or no responsibility for teaching or other academic services. It is apparent that a larger number of such personnel should be supported on a permanent basis to insure their continued productivity, future livelihoods, and university careers. Such support would avert the danger of shifting the center of gravity in many medical schools away from their

primary objectives.

The role of the hospital in the scheme of modern medical education is not fully appreciated or properly defined. A substantial part of clinical instruction of undergraduate students in many schools is provided in other than university hospitals. Over three-fourths of the 12,887 approved internships and over half of the 31,818 residencies are under such auspices. Although these appointments allegedly are for advanced training, the service features often are more prominent than the educational. The number of men and women in these areas of over-all medical education in both university and non-university hospitals is five times the number of graduates each year from the American medical schools. Hence a large part of medical education in this country is actually under hospital supervision and guidance. Better co-ordination of this major phase of professional preparation with the teaching programs of the university schools is urgently needed.

It is also increasingly evident that new and vigorous plans for continuation and postgraduate education and the adequate integration of professional services must be provided if the country is to secure in the practice of medicine of the future the advantages of developments

in the fields of science.

Although medical education is the keystone in the arch of satisfactory health services for the country, it receives only 1 per cent of the expenditures for such activities—a small fraction indeed for the essential functions which it performs in our national life. This meager support prevents the employment on a permanent basis of enough staff of the highest quality for research, teaching, and clinical responsibilities. Assurance in this regard is requisite to the stabilization and recruitment of faculties.

To a considerable degree, medical education, which is the only source of physicians, and medical research, which is its catalyst, are largely subject to influences outside their control, particularly in regard to the recruitment of well-qualified staffs and students. They and the other health professions must offer reasonable assurance of rewards and opportunities comparable with those in other callings to attract men and women of superior ability and promise if the future health program of the country is to be maintained at a high level. One of the greatest challenges of our times is that of creating public understanding of and sufficient financial support for the invaluable contributions which science and professional education can make to the well-being, comfort, happiness, and safety of the nation and the extent to which we can help others elsewhere in the world to obtain these benefits.

Medical education is not merely vocational training confined largely in a medical school to a short period of exposure to present-day knowledge. It must create an environment of learning for well-qualified students, with emphasis upon the great untapped reservoirs of knowledge in the underlying basic sciences upon which progress in medical and health services depends and upon the responsibilities of physicians in modern society. Medicine as a profession is a way of life, a dedication throughout the entire career of a doctor, that requires constant and continuing education to meet successfully the future needs of the healthy, the sick, and the disabled.

The medical course is the beginning of the career of a physician and can only lay the groundwork for his later adaptation to the growth of medical science and to shifting community responsibilities. The emphasis in that initial period should be on methods and habits of learning by the qualified student, not on "teaching" by the faculty or on annual rearrangements of the curriculum which have very little to do with true education.

If medical education broadly conceived is to contribute toward meeting the needs of our free-enterprise system of society, those responsible for defining its objectives and programs must recognize more fully than they do at present and in larger dimensions the implied obligations in shaping national policies on health matters. The public, in the last analysis, will see that the supply of doctors will be maintained, although the level of competence, if unguided, may be lower than present-day scientific knowledge would indicate as desirable. The continuation of a high quality of physicians and the recruitment of superior students and faculties in competition with other fields of endeavor will depend upon the dynamic, concerted, and courageous leadership of those responsible for such functions in society who see clearly the thread of educational needs throughout the career of the physician. Such efforts need to be focused on securing public recognition that the essential contributions of medical education and of medical research can be attained only through faculties which are supported on a permanent basis and through a supply of well-prepared students for whom adequate facilities are provided.

WILLARD C. RAPPLEYE, M.D.

Josiah Macy, Jr., Foundation New York, N.Y.

Datagrams*

PAID CLINICAL EXTERNSHIPS

The Datagrams appearing in the April, 1960, issue of the Journal of Medical Education, which discussed patterns of medical student employment, indicated that the paid clinical externship was one of the major types of employment in which medical students engaged during the course of their undergraduate medical education. Data collected from the 1959 graduating class indicated that 35 per cent of the students who reported the type of work they carried out were employed as paid clinical externs. By way of contrast, the two occupations which engaged the next largest proportion of students were laboratory technicians (23 per cent) and teaching and research in the medical school (12 per cent).

Many medical educators have expressed concern about the value of the paid clinical externship to the student pursuing a medical education. Comparative data on various dimensions of the externship as experienced by the 1959 graduating class are summarized in the figures below, with particular reference to two groups of students with different financial standing.

The proportion of students who did and did not have paid clinical externships during medical school are indicated in the following figure:

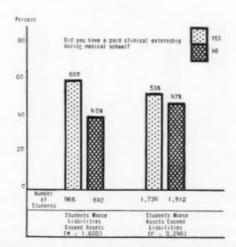


Fig. 1.—Percentage of students employed as externs during medical school

^{*} Submitted by the Division of Operational Studies of the AAMC. Source of information will be furnished on request.

The proportion of students holding paid clinical externships in hospitals which are affiliated with medical schools, in hospitals which are *not* affiliated with medical schools, and in both types of hospitals are presented in the following figure:

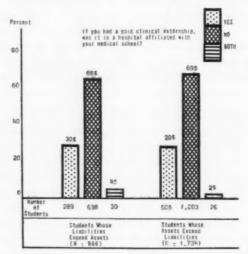


Fig. 2.—Percentage of students holding externships in affiliated and/or non-affiliated hospitals

The data concerning the duration in time of, and amount of money earned by students from paid clinical externships are summarized in the following figure:

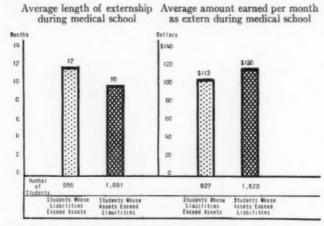


FIG 3.—Average length of externship and average amount earned per month as extern during medical school.

The data presented in the figure above must be considered in terms of the following facts: (1) the average cost of medical school to the student is approximately \$11,440; (2) the average total externship stipend per student is \$1,287. Therefore, to each student holding a clinical externship, the stipend accounts for approximately 11 per cent of the total cost of medical school.

Reports

MR. ABRAHAM FLEXNER

GEORGE H. WHIPPLE, M.D. University of Rochester, N.Y.

Mr. Flexner meant a great deal to American medicine and medical education. Hans Zinsser once said that he should be called the "uncle of modern American medicine." For a better understanding of this unusual man, a brief review of certain periods in his lifestory may be in order.

Mr. Flexner's parents came to this country in the 1850's, his father from Bohemia, his mother from the Rhineland. They met in Louisville, Kentucky, and shortly after that were married, in 1856. They had nine children, seven boys and two girls. Mr. Abraham Flexner was number six (born November 13, 1866). The family was doing well financially until the panic of 1873. At this time, they lost everything, and, from that date, the family lived in poverty, but this did not interfere with the education or the good health of any of the children. Abraham Flexner at ninety bore a strong family resemblance to his mother as she was pictured in his autobiography. His grade- and high-school education was obtained in Louisville and was satisfactory in spite of the financial difficulties. Part-time work in a library enabled him to read widely and add much to his high-school training in its last two years. The added money went into the meager family budget.

One of the important steps in his life came with his entrance into Johns Hopkins University in 1884. His oldest brother ran a drugstore in Louisville, and he encouraged Abraham to go to Hopkins and supplied much of the needed funds. Flexner came into the Johns Hopkins University shortly after it opened in 1876 under the exciting leadership of President Daniel C. Gilman, who started a school of graduate studies. In these early days, the young teachers under Gilman created an atmosphere in which graduate students were inspired and grew in stature as scholars.

Gilman was interested in men, not buildings. He went "shopping for brains." When these faculty members were appointed, Gilman gave them complete freedom of action, and the research activity grew, and publications multiplied. Mr. Flexner said he followed Gilman's formula when subsequently he developed the Institute for Advanced Study at Princeton.

Flexner could not pass the entrance examinations at Johns Hopkins, but the teachers liked him, accepted him, and gave him opportunity to make up the large deficits in his training. He did "nothing but work" in the following two years, and money was spent only for essentials. He said he had a "true reverence" for his able, stimulating, and understanding teachers. He doubled up on his classes in order to get his degree in two years—even signed up for classes in different subjects given at the same hour—attending on alternate days and covering the reading on both subjects. Special examinations were given him to enable him to pass and get credit—done by Mr. Gilman himself. He made a few friends in

Baltimore homes, and they did much to aid in his social training and to make him feel at home.

Few people are aware that Mr. Flexner spent almost twenty years of his life in Louisville teaching high-school students. After graduating from Johns Hopkins University, he returned home in 1886 to take a teaching position in the state normal school. Subsequently, he wrote some very caustic comments about developments and restrictions in the teaching within teachers' colleges. It is apparent that he could arouse great enthusiasm, even for the Greek courses, among his students. He also gave private lessons to students who were preparing for college. He lived at home and contributed his salary to the family budget. This went on for four years.

In 1890 he took on a group of five students for special preparation for college—the start of "Mr. Flexner's School." Many of the early students were problem children, perhaps failures in other schools. For fifteen years Mr. Flexner and his two sisters carried on with this private-school teaching. The essentials he mentions for teaching—enthusiasm, good humor, stimulating competition. His pupils went to various colleges and did very well—in fact, attracted the attention of President Eliot of Harvard.

The first girl to enter his school was Anne Laziere Crawford. She prepared for Vassar and graduated in 1895. She came of a prominent family in Georgia but lived in Louisville and was self-supporting. She took up writing and became a well-known playwright. She was married to Mr. Flexner in 1898. The Flexner School meanwhile had increased in size and earnings.

"A Leap in the Dark" heads a chapter in his autobiography. These words indicate that he and his wife decided to close the Flexner School and go abroad to study education, in which he felt he could make his mark. He decided to spend a year in the Graduate School of Harvard—psychology, philosophy, and logic. In the summer of 1906 he and his wife and seven-year-old daughter sailed for Europe and settled in Berlin. While there, he wrote a book, The American College, which was critical of the elective system, the lecture system, and various types of assistantships. This book was not widely read—it was ahead of its time. However, it did interest Henry S. Pritchett, the recently appointed president of the Carnegie Foundation for the Advancement of Teaching.

Mr. Pritchett invited Mr. Flexner to survey medical education in the United States and Canada. Flexner took up this task in December, 1908, and Mr. Pritchett stood behind him during all this explosive period. He visited 155 medical schools—many were diploma mills. Few had any significant equipment, and practicing surgeons and physicians owned many of the schools, gave the lectures, and divided the fees from students. Bulletin Number Four was a devastating report. Many medical schools were promptly closed. Many were reconstituted and greatly improved. He also outlined a program for future growth of medical schools. The whole picture of medical education in the United States was changed by Mr. Flexner's report.

Full-time clinical teaching was a development in which Mr. Flexner had a continuing interest. In 1911 the "full time" was debated with Dr. Welch and the senior clinical group in Johns Hopkins School of Medicine. The full-time plan was finally adopted in 1913, and money was set aside by the General Education Board to finance the clinical salaries at Johns Hopkins.

In 1913 Mr. Flexner joined the General Education Board, where he worked until his retirement. There he was associated with an unusual group of educators and philanthropists

whose main interest was betterment of all education. Butrick, Gates, Vincent, Rose, Fosdick, and Harper were conspicuous in this group. Much attention was given to medical education.

Mr. Flexner's concern about Rochester calls for a brief statement. He wished to see a fine new school established in Rochester because of its influence on the university, the city, and New York State. Incidentally, he believed this procedure would bring pressure on Columbia and Cornell. Mr. Flexner had tried in vain to interest the deans of these two schools in more progressive medicine and hoped Rochester might stir up positive action.

Mr. Eastman had given money for a dental clinic, and that might indicate a possible interest in medicine. Mr. Flexner was a most persuasive talker. President Rhees arranged a meeting with Mr. Eastman in Rochester, which led to many others and aroused Mr. Eastman's enthusiasm. Finally, it was decided that the General Education Board would give \$5,000,000 and Mr. Eastman and the Strong family, \$5,000,000. Mr. Flexner told Mr. Eastman that he was sure that Mr. Eastman would eventually give still more. After these meetings, Mr. Eastman with a smile made the much quoted statement about Mr. Flexner, "He himself is the worst highwayman that ever flitted into and out of Rochester."

In conclusion, I must say that any physician or medical student will find much of interest in Mr. Flexner's autobiography I Remember, published in 1940. He quotes a statement by Lord Haldane which applies to Flexner's lite. Dr. Welch often made similar statements.

Lord Haldane was, toward the end of his life, asked whether he would be willing to live his life over again. "My answer," he replied in a speech made shortly before his death, "was in the negative. For, I added, we are apt greatly to underrate the part which accident and good luck has really played in the shaping of our careers and in giving us such careers and such successes as we have had. The contingent plays a large part in the best-ordered lives."

THE MEDICAL SCHOOL BOOKSTORE*

ALEXANDER GREENE

The theme of this meeting according to your program is "Medical Education in a Changing World." The title of this paper is "The Medical School Bookstore." It sounds somewhat incongruous to associate one with the other, and you might well ask what the bookstore has to do with medical education. We hope to demonstrate that there is a relationship between them and one that has real significance to you as educators and as administrators.

Before we talk about stores, let us first say a few words about books and the part they play in the educational process. You are all familiar with the oft-quoted phrase of Sir William Osler's "To study medicine without books is to sail an unchartered sea." If this was true in Osler's time, how much more so is it now, with the accelerating advances in medical science adding to the body of knowledge which today's medical student must absorb. Even with the many recent developments in modern teaching procedures, there is still no substitute for good books.

In an article published in your journal some years ago Dr. David Sinclair, a well known British educator stated, "Now that so much attention is being paid to teaching methods, we are perhaps in danger of forgetting that the mainstay of medical education continues to be the printed word. After the daily battle with lectures and demonstrations, seminars and conferences, quizzes and integrated practical classes, the earnest student who wishes to pursue his studies further must still sit down and read. We have not yet reached the stage of fireside instruction in the medical curriculum by means of television."

If we can assume that books perform an essential service in the educational program of a medical school, does it not become a concern of the administration and the faculty first to indoctrinate its students with the importance of reading and owning them and secondly to assure their availability?

The first of these, indoctrination, is of such importance and interest that it could form the subject of a separate paper. Suffice it to say here that in every school there is or should be some procedure whereby the medical student is guided or instructed in the matter of reading and studying. It may be the responsibility of the administration or left to the discretion of each department head, but in either case the student can be alerted to the importance of books, instructed in the best way to use them, and provided with a list of those which will help him most in his learning processes.

Having established in the student's mind this necessity for reading and owning good books, the next concern of the administration is to provide a place where these books can be made available. All the best efforts of the faculty to indoctrinate the students in the matter of books will serve no purpose unless the books can get into their hands.

We know that all of you concerned with medical education or with administration attempt to provide available space in your school for each of the student's needs. You have libraries, lecture halls, class rooms, fully equipped laboratories, recreation rooms, lunch-

^{*} Prepared by the Medical Publishers Group.

[†] The Year Book Publishers, Inc.

rooms, lockers, and all the equipment that goes with these facilities; but how often do your plans provide adequate space for a proper bookstore? Usually this is the last matter considered in space allocation, and in some places, sad to say, it is completely overlooked.

At some of your schools there are privately owned and operated bookstores in or near the school. If these are well managed and do an effective job there may be no necessity for an institutional store. Where such facilities do not exist there is usually some form of institutional store, varying in degree from a small room where the required texts are dispensed by a part-time employee to a full-sized, adequately staffed and stocked bookstore. If it is proper to assume that the responsibility of determining the effectiveness of the bookstore facilities is that of the administration, may we suggest to you the following criteria for measuring such effectiveness.

TABLE 1

Criteria for an Effective Medical Bookstore

1. Location 2. Space

5. Other merchandise

6. Display 7. Personnel

3. Furnishings 4. Book stock

Location.—It must be convenient. Medical students, particularly those in the upper classes, have a full schedule and cannot readily take the time to go far to obtain books. Their exposure to books will depend upon the frequency with which they visit the store, and this in turn will depend on the location. From the standpoint of convenience, as well as from the sales standpoint, the ideal location is in the vicinity of a student lounge, library, cafeteria, post office, etc.

Space.—Obviously, the space for a medical school store must be adequate for the purpose. The need will depend on the variety and quantity of merchandise handled other than books. In a survey made 2 years ago, stores reported a selling area ranging from a little over 300 square feet to 10,000 square feet with an average of 2,000. In addition, they reported storage areas ranging in size from none at all to 5,000 square feet, with an average of 1,000 square feet. The one thing which should be pointed out here is that some stores have done a great deal with very little area. It is quite evident, however, that the number of volumes that can be displayed depends on the space available. The number of customers that can comfortably examine books at one time depends on the selling space, and the ability to maintain an adequate stock depends upon the amount of storage space available.

Furnishings.—The store should be adequately furnished with ample tables and chairs where students may sit and examine books in comfort. It should also be attractively decorated within the limits of the budget so that it has a pleasant and comfortable atmosphere, one which would be inviting rather than repelling.

Hours.—The bookstore should be open the entire day, or at least during the hours of scheduled classes. Nothing is more frustrating for a student whose time is limited than to go to the store for a book which he must have that day and find the store closed.

Book Stock.—Even the least effective store must have on hand at the proper times and in proper quantities the textbooks which are to be recommended by the faculty. This requires a continual flow of information between the bookstore manager and the heads of the various departments or the instructors who have the responsibility for recommending textbooks.

It should be made clear at this point that the book room type of operation, in which only the required books are stored and distributed, does not meet the criteria of an effective bookstore. It can be run with limited personnel and can be profitable, but it most assuredly does not help the students in selecting other books which they may need in their courses.

It is essential that the store carry a wide variety of titles which would include the required texts as well as other books which are recommended by the different departments as supplementary reading. To this should be added at least three or four copies of the new books of all the publishers that have any application whatever to the study and practice of medicine. What is an adequate stock? This varies according to the size of the school and the size of the store, but we find that the best stores carry as many as 2,500 titles and certainly 1,000 would be a minimum. It should be remembered that the service performed by the bookstore in this respect is also available to the faculty and staff of the hospital and in some cases to the practicing physicians in the area.

Other Merchandise.—It is frequently desirable to carry items other than books, particularly those which a student needs for laboratory or classroom use. These may include laboratory coats, instruments, microscopes, stationery, toilet articles, etc. The sale of such merchandise can add considerably to the store's profits.

Display.—The books should be easily accessible for examination. Both shelves and tables should be used. The shelves should be arranged in library fashion according to subject with each classification well labeled so that students interested in a particular subject can easily find all titles available, including the latest ones. There should also be separate displays on tables of the recently published books. Many stores use a small bookrack prominently placed in which these newer publications are displayed, with comfortable chairs nearby where the books can be studied in more detail. Consultation with a local firm experienced in setting up shelving and counters for display purposes would be very helpful toward final plans for a new store layout.

Personnel.—Last but not least is the question of personnel. In our opinion this is the most important qualification of all. The store should have a full-time manager—one who is fully informed on medical publications, who knows the titles and publishers of the books and is aware of new books which are being published in the future. He should be in close touch with the faculty in order that he may know what books they are recommending and have copies available when needed. He should have sufficient knowledge of business to handle the financial transactions between the students and the store and between the store and the publishers. Such people are not easy to find; but they can be trained, and many of those who are now operating stores at a high degree of efficiency started their jobs with little or no background and have acquired their knowledge by experience. Such a person should be adequately paid in order that he may have a live interest in maintaining the efficiency of operations and give first-class service to the students. The number of additional personnel needed will depend on the size and activity of the store.

The manager of the store, whether experienced or not, would find it an advantage to take an individual or store membership in an organization called The National Association of College Stores. This Association has taken an active interest in training bookstore personnel and now holds yearly summer workshops in which many medical store personnel participate. The Medical Publishers Group, whose views this paper represents, are contributing several scholarships to this workshop since we believe it is an important contribution to the store training and education of bookstore managers.

With the above criteria established for an efficient medical bookstore, the question which may next come to your mind is "Can an institutional store be operated successfully and profitably by the school?" It would be difficult to answer this question categorically, but we do know that there are institutions that are now operating such stores and which seem to be meeting all the requirements mentioned above.

Through the courtesy of the National Association of College Stores, we are permitted to

present some statistics from a recent survey of medical bookstores.

Returns on the survey of school-owned or co-op medical stores were especially good. Forty-one of the 51 questionnaires sent out were returned.

Following a usual pattern in College Stores, 24 of the 41 stores did not pay any rent at all. Only nine stores paid more than \$1,200 annually. Six paid rents ranging from less than \$500 to \$1,200. Two did not respond to this question. Only one store reported that it did not have a full-time manager.

Square feet of selling space ranged from nine having more than 1,000 to thirteen with 600-1,000 and twelve with 300-600. Four stores had less than 300 square feet. There was a tendency for the larger stores to also have the larger storage space. Eight had more than 1,000, two had 500-1,000, and ten had 200-500. Sixteen stores had less than 200 square feet of storage space, indicating either extremely cramped quarters or that they were operated as a branch of a large store that could draw on the main store stock.

Twenty-five stores said they were in a medical school location. Four indicated that they were in a hospital as well. Five were in a student union building, one in a hospital, and five were in "other building." Only five stores said they were in a poor traffic spot. Three were

departments in large university stores.

Eleven stores carried over 1,000 medical titles; seven, 600-1,000; eleven, 300-600; eight, 100-300; and two, under 100 titles. Most of the stores (28) indicated that their medical books were on open shelves. Other stores said they were in part on open shelves but mostly behind the counter. Twenty-five of the stores said they used displays, and eighteen said they had tables and chairs for examining books.

Seven stores did over 75 per cent of their business in medical books, eleven did 75 per cent in books, twelve reported books and other merchandise were even, and in seven, medical books were only 25 per cent. Three stores did not answer. The most profitable items in order of repetition were paperbacks, lab coats, and stationery. Three stores indicated that texts were the most profitable single line.

Nine managers make more than \$5,000 annually, fifteen between \$4,000 and \$5,000, seven between \$3,000 and \$4,000, and seven said they made under \$3,000. Two stores did not answer.

Six stores said they had a half-time clerk, seven had a full-time clerk, eight said they employed two clerks, and six said they employed three clerks. Six stores said they had more than three, but these must have been large stores with special departments. Seven stores did not respond to this question.

Ten stores in each category said their book volumes were over \$100, \$75-\$100, \$50-\$75, with three stating that they did under \$50 per student. Seven stores did not answer.

Only four stores gave a discount or rebate to students, and two of these were affiliated with one of the large university co-ops. Almost all stores used profits for general university funds. One did use profits for scholarships, and four stores rebated profits. One gave funds to the library. Ten stores said they made over \$10,000 profit, but five of these stores did not pay any rent. Seven stores made from \$7,000 to \$10,000 profit. Ten made \$3,000 to \$6,000 profit, and six from \$1,000 to \$3,000. One store made less than \$1,000. Six stores did not answer this question.

The new bookstore at the New York University Medical School is an example of what can be done by administrative planning and good management. It can be considered typical of the upper average of institutional stores. Through the courtesy of the business office, we have been permitted to report the following statistics:

The store is centrally located in the medical school building, having 800 square feet of selling area and 100 square feet of storage area. It carries over 1,000 different titles other than regular textbooks. The books are arranged on open shelves by subject, and there is ample room for students to sit and examine books at length. Although medical books represent about 75 per cent of the store's volume, it sells in addition stationery, instruments, gift items, lab coats, trade books, etc., none of which are readily available to students in nearby stores. The annual volume of medical books sold per student is over \$100. The present store has been operating for only three years, and the volume of business has risen over 300 per cent in that period. The profits which were nonexistent four years ago are now between \$3,000 and \$6,000 per year.

Mr. Alexander Zavelle, the director of the New York University Campus Stores, who kindly supplied us with these figures, states that the two most important factors in the success of the medical school store have been the interest and cooperation of the administration and faculty and the employment of experienced personnel. He feels that the training available through the National Association of College Stores is tremendously helpful.

To summarize the above we can state with confidence that an effectively managed and well stocked institutional medical bookstore can make a significant contribution to the economic welfare of the school and help greatly to maintain the high educational standards which you have set for your institution.

Representatives of our companies here now and those who call regularly at your schools will welcome the opportunity to discuss your bookstore problems with you. Although we are essentially a commercial group, we do honestly share with you a keen and unselfish interest in improving medical education in a changing world.

ABSTRACTS FROM THE WORLD OF MEDICAL EDUCATION

Angela Sanchez-Barbudo, Ph.D Abstract Editor

Grandeur and Poverty of Medical Specialization. By Ignacio Chávez, M.D. Circulation, Vol. 20, No. 4 (October, 1959), Part I, pp. 481-89.

Professor Chávez (of the Institute of Cardiology, Universidad Nacional de México, Mexico, D.F.) expresses in this editorial acute anxiety over the perils of specialization. Specialization, in his view, though fertile in valuable achievements, also means fragmentation, partial vision, and limited horizon, which, in the end, could bring about the dehumanization of medicine and of the physician. Trying to analyze that which separates our century's era of research and laboratory from the past, Dr. Chávez points out that it is not so much that pretwentiethcentury medicine had not been scientific (who could ask for greater scientific exactness than that shown by a Claude Bernard, a Pasteur, a Virchow, or a Roentgen?) but rather that now it is not only a fragmentary aspect or isolated field which is being transformed, but all the fields of medicine are attacked scientifically, by experimental methods, and the basic sciences have entered into all of them. The "harvest" has been extraordinary (in the field of cardiology, for instance, the achievements of the last halfcentury surpass by far all the contributions of the preceding centuries put together). A natural result, however, of the invasion of the basic sciences, the technicalization of medicine, and the accumulation of new knowledge has been the birth of specialities. The great advantages that these signify, either for the pragmatic aspect of the profession or as a factor for the advance of knowledge, cannot be denied or even debated in the light of the amazing contributions made by each specialty in its own field. However, a specialist's research is soon exhausted if he works only as a clinician and technician, without a broad training in the basic sciences. Thus a conflict has arisen between pure, or basic, research and applied, clinical research. The disdain shown by some "pure" scientists toward the clinical researcher is, in the author's view, a seriously wrong attitude which can only lead to inhibition of the necessary collaboration between the two groups. While it is true that "pure" research usually gives the clue to the great scientific problems (cf. Einstein's relativity theory, Fleming's discovery, Planck's equation theory, etc.), "applied" research, though differing in goals and immediate results, can be as noble and scientific as the other, provided that it is carried out with scientific method. The two kinds of research are not strangers and ought to complement each other; but, in order to accomplish this, the specialist must have sound scientific training. However, if and when this requisite is fulfilled, Dr. Chávez foresees that then the crucial problem of our time, the divorce from humanism, will become still more acute. Yet, for him. there is no worse form of "spiritual mutilation" in a physician than the lack of humanistic culture, because humanism is not a luxury, a refined pastime of scholars: it means also the understanding of man, of his aspirations and miseries; the evaluation of what is good, just, and beautiful in life; and the setting of the standards which rule man's inner world. It was humanism which created our modern world, and it was his humanistic heritage which gave the physician, through the centuries, his superior position and authority over his patients, making him a counselor and guide as well as a doctor. However, the humanism recommended as a complement to scientific education can no longer be the traditional one which cultivates Greek and Latin or probes the history of philosophical thought. Our age no longer permits such omnivalence. The "humanism of our time" must be dynamic and effective: its roots consist in the knowledge of the principal living languages, another essential requisite being the knowledge of the history of nations, of civilizations, and of thought (for the physician also of the history of medicine). After such a knowledge of language and history is attained, the recognition of social reality and a keen interest in the great problems of our time—another vital part of the new humanism-follow easily. This kind of humanism, deeper and more passionate than the old, constitutes, the author believes, "the indispensable prescription for the specialist of today," because it contains the "corrective for scientific deformity."

Physiology Laboratory: Philosophy and New Techniques. J. C. Rose, M.D., E. R. RAMEY, Ph.D., and L. S. LILIEN-FIELD, M.D., Ph.D. The Bulletin-Georgetown University Medical Center, Vol. 13, No. 1, pp. 49-53 (Aug.), 1959.

This is a report on the latest laboratory techniques in teaching physiology, with special emphasis on exercises involving the use of radioactive isotopes. Such a program is being tried out at Georgetown University School of Medicine, with the help of a special grant by the AEC. The ultimate aim of this laboratory program is to develop an an appreciation of the scientific method. Experiments are designed to measure rather than to demonstrate physiological principles. A few brief descriptions of experiments (such as analysis of the blood-brain barrier; analysis of the blood-aqueous barrier of the eye; blood volume, intestinal absorption,

etc.) serve to indicate the scope of the program. Prior to the use of radioactive tracer substances in the physiology laboratory, instruction includes both a review of theoretical material and practical instrumentation exercises (operational procedures are described during informal laboratory conferences and radiation safety measures are emphasized). All experiments are discussed before the assembled class, ample time being provided for the analysis and interpretation of over-all results. It is hoped that these laboratory experiences in physiology will lead to an earlier development of the habits of painstaking observation, careful analysis of data, and logical interpretation by the students.

Sviluppo della ricerca medica sul piano internazionale (The Development of Medical Research on an International Scale). PIERRE DOROLLE, *Minerva Medica*, Vol. 50, No. 79, pp. 1812–18 (Oct. 3), 1959.

The Director of the World Health Organization discusses in this paper some facts and problems concerning international cooperation in medical research. While medical research organized on a national basis has increased tremendously in the last few decades (as shown by a brief survey of 30 countries where it is stimulated and facilitated by government organisms), its international organization, of much more recent origin, has not yet been fully developed. In fact, not before the creation of the World Health Organization in 1946 has there ever been in the field of health an inter-governmental organism assuming constitutional responsibility for stimulating and guiding research, and acting as a directive and coordinative power, on an international scale. During the first 10 years of its existence, the W.H.O. (which now counts 87 member and three associate nations) has been engaged mainly in operative research, that is, the bringing to light of new data useful in its fight against contagious diseases. How much this research has contributed to the victories obtained is demonstrated by the fate of diseases such as influenza, malaria. tuberculosis, polio, tracoma, syphilis, etc. In the course of this kind of research, an international network of over 1,000 laboratories and institutes has been formed whose research staff works-without remuneration-in close contact with the W.H.O. (its own secretariate includes many outstanding medical specialists). These scientific correspondents belong to all kinds of cultural and ethnic groups, but their activities are absolutely free from any influence of international politics. After 10 years of active, successful battle against the greatest scourges of mankind, the W.H.O. could enter into a second phase, that of concerted international action for medical research. A vast program has already been presented to the XIIth Assembly of the W.H.O. It is based on the principle that the individual genius is the primum movens of all scientific research but that even the most gifted individual can reach its highest productivity only in a favorable environment. Optimum conditions are represented, it is believed, by the traditional and congenial university-or research institute-atmosphere. The W.H.O., therefore, has always sustained the opinion that research must be basically a national affair, conducted by the universities and scientific institutions of each country; and it rejects the idea of an international research center because this would only prove to be an artificial and precarious creation. This does not mean, however, that the W.H.O. limits itself to recognize and ratify the existing research efforts made through the individual initiative of its member nations: the importance of its activities lies in the faculty to coordinate all these different efforts toward certain goals which could never be attained by isolated work on a merely national basis. (In many countries economic conditions would preclude any broader research project for financial reasons alone.) One of the principal problems the W.H.O. has to cope with is to determine to what extent a proposed research project is necessary, practical, and what are its possi-

bilities of success. A careful selection of projects with priority rights is of vital importance, since international resources are by no means unlimited. As to the means the W.H.O. possesses to stimulate, support, and develop medical research on an international scale, it is pointed out in this report that all nations, even the most developed ones, are still in need of a superior type of scientific formation, and that even the most renowned masters in their field will still benefit from the contact with a scientific elite. To function as such a superior type of organism is one of the principal roles of the W.H.O. Another task is the world-wide formation of research workers and research teams, so essential for the progress of medical science. Financial aid is offered those countries which are now in the process of establishing their first cadres of medical research but are unable to provide the necessary means. The carrying out of such a program of training and perfectioning of research workers demands great prudence and continuous vigilance on the part of the World Health Council, because the precious international funds must not be wasted. Still another problem which can only be solved by a world organization is the unification of scientific terminology and the standardization of technics and research materials, which is indispensable for the communication, complete intelligence, and appreciation of the work carried out in the different countries.

Teaching in the Universities (Editorial). Nature, Vol. 183, pp. 1623-24 (June 13), 1959.

As universities get bigger, the problem of providing adequate and competent teaching staff is becoming more and more acute. Among the various functions of a university. the imparting of knowledge and its interpretation are considered of foremost importance, and the question is raised to what extent this is successfully accomplished. Although the teacher is today frequently the object of criticism, it is pointed out that "those who are bad and beyond redemption" are not nearly as numerous as the critics would have us believe; furthermore, their number can probably be matched by those who seem to have been born for the job. The large majority of university teachers are "reasonably good craftsmen" whose shortcomings could be helped easily if they were prepared to spend some time in learning their craft. A good step in this direction would be to follow some of the advice put forward by G. Kitson Clark (reader of constitutional history at Cambridge) and Commander E. Bidder Clark, in The Art of Lecturing. Some Practical Suggestions (Cambridge, 1959). This work contains a series of "severely practical" suggestions as to the methods of lecture-delivering. The successful lecturer, it is emphasized, never underrates his audience's intelligence or knowledge, and does not "talk down to them" (the greatest fault of most bad lecturers, who, furthermore, often impart in their classes information readily available from standard text-books). Some of Kitson Clark's most useful advice concerns voice production. However, the point is stressed that, no matter how good the technique, no lecture can be successfully presented that has not been thoroughly prepared. As to the use of audio-visual aids-still surprisingly seldom, or badly, used-Bidder Clark describes the contributions to better learning made by the blanket board, the prepared "chart" models, the episcope and the film projector. Commented on is also the fact that some university lecturers approach their teaching "with the dilettante air of the amateur" which bewilders many students who expect higher standards of university teaching. Why this should be so when most universities are "adorned" by departments of education raises the question whether university teachers are unable to profit from courses in pedagogy. This, it is argued, is a matter which needs careful consideration by university administrations.

NEW BOOKS

KENNETH E. PENROD Book Review Editor

Abstracts

Handbook of Physiology. Section 1: Neurophysiology II. Editor-in-Chief: John Field. Section Editor: H. W. Magoun. Executive Editor: Victor E. Hall. Washington, D.C.: American Physiological Society, 1960. 781–1420 pp. \$20.00.

The first three volumes of this Handbook, of which this is the second, constitute the "Section on Neurophysiology." The first volume of this Section was acknowledged in The Journal of Medical Education, December, 1959. The entire series is addressed to students, young and old, with considerable background in physiology, who need to raise their level of understanding and sophistication to that adequate for predoctoral study, for teaching and for preliminary orientation in preparation for research. The first three volumes of the Handbook are devoted to neurophysiology, since this field has been so transformed by the developments of the past 25 years as to make it the obvious choice for first treatment.

Modern Nutrition in Health and Disease. By Michael G. Wohl and Robert S. Goodhart. 2d ed. Philadelphia: Lea & Febiger, 1960. 1084 pp. \$18.50.

This book has been compiled through the contributions of 59 different individuals. The appearance of the second edition within 5 years of publication of the first is indicative of the rapid advances still being made in the field of nutrition. Revision involved many deletions and more additions. There are two entirely new sections, one on chemical and other additives to foods, and the other a discussion of dietary factors in the production of atherosclerosis and coronary artery disease. The discussion of nutrition and resistance to infection has been divided into two parts, (A) Nutrition and Natural Resistance to Infection and (B) Nutrition in Relation to Acquired Immunity, so that the major aspects of the relationship might be more

readily comprehended. The chapter on Principles of Emergency Feeding has been revised and expanded to include current recommendations on minimal nutritional allowances. It is the hope of the authors that this text will amply fulfill its purpose of bringing to the reader up-to-date authoritative information on the basic knowledge of nutrition and its application to the practice of medicine.

Medical X-Ray Technique—Principles and Applications. By G. J. VAN DER PLAATS. New York: The Macmillan Company, 1959. 471 pp. \$10.00.

This is a textbook for all concerned in the medical employment of x-rays in diagnosis and therapy and particularly for radiographers in training. A certain amount of knowledge of mathematics and physics is assumed so that the basic treatment of elementary material could be omitted. Very little attention is paid to the subjects of radiographic positioning and centering, since these are well covered in other texts. A chapter on radioactive isotopes is included in view of the close relationship which exists between this subject and the radiological problems treated in the therapy section. Certain points have been treated with extra thoroughness in order to ensure that the radiographer is in full possession of the knowledge necessary to carry out all types of procedures, which call for highly specialized experience. Such detailed information appears throughout the book in small print. In some instances the large print deals with the same subject matter as the smaller print; in the latter the treatment is more thorough and elaborate.

Anatomy: Regional and Applied. By R. J. Last. 2d ed. Boston: Little, Brown & Company, 1959. 721 pp. \$15.00.

This text was written primarily to help students who are preparing for anatomy examinations. However it has found wide use among clinicians and surgeons in their practice. In this edition there are 74 more pages. However, more than half of these are taken up by new illustrations. As was pointed out in the first edition of the book, it is intended to be read alongside the dissected body or a museum specimen. The new illustrations are added at the request of those who lack such facilities. Nearly a dozen of the new pages are taken up with summaries on the nerves of the limbs, for the convenience of viewing each named nerve as a whole. The other new material is chiefly on microscopic anatomy and on joint movements, but countless small adjustments and additions have been incorporated throughout the text. The scope of the book is not encyclopaedic; the author has sought to exclude details that have neither practical application nor value in illustrating a general prin-

Cates' Primary Anatomy. By J. V. BASMA-JIAN. 4th ed. Baltimore: Williams & Wilkins Company, 1960. 347 pp. \$6.50.

The aim of this new edition remains the same as that for the previous one: to attempt to make it the most useful textbook in its special category. The book is designed especially for those students who take a fairly comprehensive course in anatomy at the college or university level such as physical and occupational therapists, graduate nurses, students in physical and health education, honors biology, etc. The systems concerned with locomotion and the circulatory system are considered the most intensively, because they are the chief concern of the majority of students who use this book. Except for considerable rewriting on the nervous system, the changes in the text consist of many

scattered corrections and alterations. On the other hand, a very expensive change will be found in the illustrations. These now number more than 500 original figures, many of which are believed to be quite unique.

The Story of Dissection. By JACK KEVOR-KIAN. New York: Philosophical Library, 1959, 77 pp. \$3.75.

This is an historico-philosophical account of the often weird and peculiar methods used in dissection of the animal and human body from antiquity to the days of Puritanism, together with the various taboos and superstitions connected with such enterprises.

The Extremities. By DANIEL P. QUIRING and JOHN H. WARFEL. 2d ed. Philadelphia: Lea & Febiger, 1960. 116 pp. \$3.25.

The original idea leading to this book was an awareness of a need among students of anatomy for a concise, handy aid to the study of the skeletal muscles of the human body. This edition has been revised and edited by Dr. Warfel following the death of Dr. Quiring. This book is built around a series of excellently prepared line drawings, showing the origin, insertion, action, and arterial and nerve supply of muscles of the upper and lower extremities, together with their motor points. It is a helpful guide to students who do not find diagramatic representations and condensed descriptions adequate to describe the complex relations involved. It is a convenient, highly practical text for medical students and a valuable reference source for practitioners, and for physical and occupational therapists.

Two exciting new

SIGERIST

ANTHOLOGIES

available as a set, handsomely boxed at the special combination price of \$10



HENRY E. SIGERIST ON THE HISTORY OF MEDICINE

Edited by Félix Martí-Ibáñez, M.D. / Foreword by John F. Fulton, M.D.

In twenty-seven highly diversified essays and articles, Sigerist presents an entertaining and enlightening view of the history of medicine. This carefully selected collection spans the time from the beginning of the practice of medicine to the present, vividly portraying the events and the men who have made medical history. In presenting his major concepts and ideas within the framework of these writings, Sigerist reveals himself as the wit, scholar, and great historian that he was.

316 PAGES / CLOTH BOUND / \$6.75

HENRY E. SIGERIST ON THE SOCIOLOGY OF MEDICINE

Edited by Milton I. Roemer, M.D. / Foreword by James M. Mackintosh, M.D.

The views and concepts of Sigerist on medical sociology have never been more clearly nor comprehensively presented than in this anthology of thirty-one essays and articles. This volume contains the essence of his theories on the sociology of medicine and the best of his medico-sociological writings. Within these pages Sigerist exhibits his extreme concern for the future of medicine and of mankind and reveals himself as a supreme humanist and individualist. This fascinating collection provides an extraordinary insight on the changing world of medical sociology.

400 PAGES / CLOTH BOUND / \$6.75

MD
PUBLICATIONS, INC.
New York

Please send me the following books:	
HENRY E. SIGERIST ON THE HISTOR	Y OF MEDICINE \$6.75
HENRY E. SIGERIST ON THE SOCIOLO	GY OF MEDICINE \$6.75
Both books at the special combin	ation price of \$10.00
NAME	CHECK ENCLOSED
NAME(PLEASE PRINT) ADDRESS	☐ CHECK ENCLOSED
(PLEASE PRINT)	

NEWS FROM THE MEDICAL SCHOOLS

Albany

Dr. Frank C. Maxon, Jr., assistant professor of medicine and head of the sub-department of pulmonary diseases, was elected president of the New York Trudeau Society at its annual meeting in Syracuse, April 8. The American Trudeau Society, with which the state society is affiliated, is the medical section of the National Tuberculosis Association.

Boston

Dr. LAMAR SOUTTER, professor of surgery and acting dean since September, has been appointed dean of the School of Medicine.

Dr. Lamar Soutter

The announcement was made by President HAROLD C. CASE, who said Dr. Soutter will be responsible for the development of policies and practices contributing to the general advancement of the school.

Dr. Soutter was educated at St. Paul's School in Concord,

N.H., and received both his A.B. and M.D. degrees from Harvard. After receiving his surgical training at the Presbyterian and Bellevue Hospitals in New York, the Free Hospital for Women, and the Massachusetts General Hospital, he began the practice of surgery and started the blood bank at the Massachusetts General Hospital. He also established the blood bank at the Chelsea Soldiers' Home and became the first head of the blood section of the State Civil Defense Agency. Soutter joined Boston's medical school faculty in 1952 and was named associate dean in 1955. In this position, he worked with a committee from the university's College of Liberal Arts and the Medical School under a grant from the

Rockefeller Foundation in drawing up a new curriculum designed to permit qualified graduates of secondary schools to enter a combined course of liberal arts and medicine.

The legal and administrative problems arising from today's extensive medical research programs will be studied at Boston University's Law-Medicine Research Institute through a \$75,000 grant from the Public Health Service. The Institute will conduct this study over a two and a half year period, utilizing its staff of lawyers, physicians, social scientists and researchers. Dr. IRVING LADIMER, former assistant director of the Research Planning Branch, National Institute of Mental Health, has joined the staff of the Institute to take on the new project. Also participating in the program will be special advisory committees of the country's scientists, physicians, hospital administrators and others working in clinical medical research and related areas.

Describing the aims of the program, Institute Director Professor William J. Curran stated that study in this project will center on the problems which have arisen in medical research in regard to administrative practices followed in planning, conducting and supporting clinical research. Some of the key areas for study will be research design, personnel standards, reporting procedures, precautionary and protective measures for the researchers and the subjects of research, professional advisory review and audit, legal and ethical considerations and institutional responsibility and control.

Colorado

Dr. C. Wesley Eisele, assistant dean in charge of postgraduate medical education for the School of Medicine, is the new president of the Commission on Professional and Hospital Activities. He was named at the annual session of the group at Ann Arbor,

Many **MIGRAINE** attacks can be **stopped at the start** by the prompt use of...

'MIGRAL'

Advantage

'MIGRAL' permits maximum ergotamine therapy with the first dose
—because the 'MIGRAL' formula includes the proved antiemetic,
cyclizine hydrochloride, to counteract the tendency to nausea and
vomiting.

Dosage

'MIGRAL' should be taken immediately at the start of a migraine attack, and the effective dosage should be determined on an individual basis. When the total dosage necessary to stop an attack has been determined, that amount should be taken as initial dosage in subsequent attacks.

In general, 2 to 4 'MIGRAL' tablets taken at the first sign of an attack will terminate a headache by preventing progression to the vasodilation stage. If treatment is not started sufficiently early to achieve this result, an additional 1 or 2 tablets should be administered every half hour until the patient is relieved, or until a total dosage of 6 tablets has been taken.

Caution

It is recommended that not more than 6 tablets be taken during a single attack, nor more than 10 tablets per week.



Michigan, recently. The Commission is a service organization for hospital staffs, and through a system of professional activity studies, provides member hospitals with information for improving treatment and care.

U. of Chicago

Dr. LOWELL T. COGGESHALL, dean of the Division of Biological Sciences since 1947,



was named vice-president of the university. In his new position, Dr. Coggeshall will be responsible for the development of medical research programs and facilities at the university.

A graduate of Indiana Dr. L. T. Coggeshall University's School of

Medicine, Dr. Coggeshall began his teaching career there as an instructor in zoology from 1922 to 1923. He moved to the University of Chicago in 1925 as assistant professor of medicine and later served on the faculty at the University of Michigan School of Public Health as professor of preventive medicine. Coggeshall returned to the Chicago campus in 1946 as chairman of the department of medicine.

He was staff member for research in tropical diseases, the Rockefeller Foundation, and served as special assistant to the Secretary of the Department of Health, Education, and Welfare. Dr. Coggeshall is a former president of the Association of American Medical Colleges.

Dr. ROBERT D. MOORE, associate professor of surgery, will become chief of the orthopedic section of the department of surgery July 1, succeeding Dr. C. HOWARD HATCHER, who has resigned. Dr. Moore also will become professor of surgery at that time. He first joined the faculty of medicine in 1943 as an instructor and in 1946 was appointed assistant professor, a position he held until 1948 when he resigned to enter private practice as an orthopedic surgeon. Dr. Moore rejoined the faculty in 1958.

Dartmouth

A drive for \$10 million in capital funds is under way at the Dartmouth Medical School. Approximately \$5 million of the total sought to expand the teaching and research facilities has already been subscribed through major gifts from foundations and the Public Health Service. The principle objectives of the fund campaign are: construction of a new \$3 million, seven-story medical science building, which is now under way; construction of library and auditorium facilities; and increased endowment to place the expanded faculty on a permanent basis.

Duke

For the first time in 33 years, the Duke University Medical School will have a

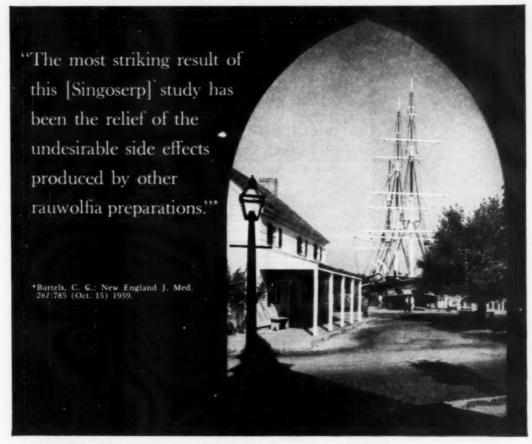
new dean. Dr. BARNES WOODHALL, a veteran of 23 years on the faculty, will succeed the school's first dean, Dr. Wilburt C. Davison, who is retiring. Dr. Woodhall will take over his new duties July 1. Dr. Davison will serve during the 1960-61 academic year as James B. Dr. Barnes Woodhall Duke professor of pedi-



atrics, a position he has held for many years in addition to the deanship.

Woodhall, a neurosurgeon, earned the A.B. degree from Williams College and the M.D. degree from Johns Hopkins. He was a resident and instructor at Johns Hopkins from 1931 until 1937 when he joined the Duke Medical Center faculty as assistant professor with the responsibility of organizing the neurosurgical service. At the present time he is serving as treasurer for the Second International Congress of Neurological Surgery to be held in this country next year. In addition, he is a member of the executive council of the World Federation of Neurosurgical Societies. Co-editor and a contributor to a recently published twovolume History of Neurosurgery in World

from the New England Journal of Medicine:



results you can confirm in your practice:

"In 24 cases syrosingopine was substituted for the rauwolfia product because of 26 troublesome side effects; these symptoms were relieved in all but 3 patients."*

Incidence with Prior Rauwolfia Agent	Incidence with Singoserp	
11	1	
5	0	
7	0	
2	2	
1	0	
	with Prior Rauwolfia Agent 11 5 7	

(Adapted from Bartels*)

many hypertensive patients prefer

Singoserp[®]

because it lowers their blood pressure without rauwolfia side effects

Tablets, 1 mg. (white, scored); bottles of 100.

C I B A

Complete information available on request.

MAKE YOUR TEACHING MAKE YOUR TEACHING



Prior-Silberstein PHYSICAL DIAGNOSIS

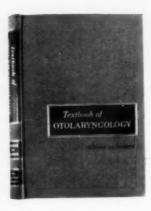
Here is an entirely new approach to the problem of introducing the student to clinical medicine. Hailed by the Chairman, Department of Medicine at a Big Ten Medical School as "the best textbook on physical diagnosis that has been yet produced," this new book acquaints the student with the most important basic tools of his trade—the history, physical examination and essential medical terminology. This book helps you fulfill the fundamental objective of a course in "Physical Diagnosis"—to teach the student how to obtain a good history and to perform a satisfactory physical examination.

By JOHN A. PRIOR, M.D., Professor of Medicine, Ohio State University, College of Medicine, Columbus, Ohio; and JACK S. SILBERSTEIN, M.D., Clinical Associate Professor of Medicine, Ohio State University, College of Medicine, Columbus, Ohio, and 8 contributors. 1959, 388 pages, 634" \times 934", 193 Illustrations. Price, \$7.50.

Just Published! DeWeese-Saunders TEXTBOOK OF OTOLARYNGOLOGY

written by outstanding men who are active practitioners and experienced teachers, this authoritative new text is more complete than any student book yet available, but it is concise enough to be read during an average length course. More than 350 fresh, pertinent illustrations assist the student in examination and identification of common lesions. Separate chapters are devoted to physical diagnosis, salivary glands, facial nerve, physiology of hearing and modern audiometry including the latest testing methods. Extremely broad in coverage, the book clearly discusses every aspect from lip reading to modern techniques in otologic surgery.

By DAVID D. DeWEESE, M.D., Clinical Professor of Otolaryngology, University of Oregon Medical School, Portland, Oregon; and WILLIAM H. SAUNDERS, A.B., M.D., Associate Professor, Department of Otolaryngology, Ohio State University, Columbus, Ohio. Just published. 1960, 464 pages, $634^{\prime\prime}\times934^{\prime\prime},354$ illustrations. Price, \$8.75.



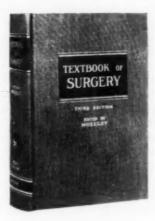
5th Edition Kleiner-Orten HUMAN BIOCHEMISTRY

A complete re-evaluation of current needs in teaching biochemistry to medical students, the 5th edition of HUMAN BIO-CHEMISTRY presents the latest discoveries of biochemistry as an integral part of the clinical practice of medicine without usurping the clinician's domain and without neglecting fundamentals. For example, the important chapters on metabolism and the one on blood have been completely rewritten, and large parts of the vitamin, hormone and other chapters have been extensively revised.

By ISRAEL S. KLEINER, Ph.D., Professor and Director of the Department of Blochemistry, New York Medical College, Flower and Fifth Avenue Hospitals; and JAMES M. ORTEN, Ph.D., Professor of Physiological Chemistry, Wayne State University College of Medicine, Detroit, Mich. 1958, 5th editien, 808 pages, 6½" × 9½", 94 text illustrations, 5 color plates. Price, \$9.00.

Gladly Sent to Teachers for Consideration As Texts

It's not too late to choose these new Mosby books and editions which stress up-to-date theories and techniques



3rd Edition Moseley TEXTBOOK OF SURGERY

Because visual aid in the teaching of surgery is so important, 167 black and white and 30 full color illustrations have been added to the new 3rd edition of Dr. H. F. Moseley's TEXTBOOK OF SURGERY. The text is completely revised, expanded and brought up-to-date to include many of the most recent advances in this specialty. Sections on surgery of the heart, great vessels and lungs have been completely rewritten. This book discusses important principles of clinical background and gives "reasons why" certain procedures are followed.

Edited by H. F. MOSELEY, M.A., D.M., M.Ch. (Oxon), F.A.C.S., F.R.C.S. (Eng.), Assistant Professor of Surgery, McGill University; Associate Surgeon, Royal Victoria Hospital, Montreal, Canada. Written by 40 eminent surgeons and educators. 1959, 3rd edition, 1336 pages, $6\%\text{e}^{\prime\prime}\times10^{\prime\prime}$, 738 text illustrations, 108 color plates. Price, \$17.00.

Willson-Beecham-Forman-Carrington OBSTETRICS AND GYNECOLOGY

Answering a long existent need for a textbook that combines obstetrics and gynecology, the Willson-Beecham-Forman-Carrington book was specifically written as a textbook for combined courses in these subjects. Nonetheless, this book contains sufficient information for use as a text for separate courses in each area. Describing widely accepted methods currently in use at the Temple University Medical Center, this book contains basic information concerning the management of normal pregnancy and delivery, and describes the development and recognition of complications and their management. You'll find the book provides the student with detailed discussions of methods for recognizing and treating common gynecologic disorders.

By J. ROBERT WILLSON, M.D., Professor and Head of the Department of Obstetrics and Gynecology; CLAYTON T. BEECHAM, M.D., Clinical Professor of Obstetrics and Gynecology; ISADOR FORMAN, M.D., Clinical Professor of Obstetrics and Gynecology; and ELSIE REID CARRINGTON, M.D., Assistant Professor of Obstetrics and Gynecology, all at Temple University School of Medicine and Temple University Medical Center. 1958, 605 pages, 634" × 934", 267 illustrations. Price, \$10.75.





Gladly Sent to Teachers for Consideration As Texts

The C. V. MOSBY Company

3207 Washington Boulevard . St. Louis 3, Missouri

War II, Dr. Woodhall is a member of the Advisory Editorial Board on Medical History to the U.S. Army Surgeon General.

Dr. Davison is relinquishing the deanship after being responsible for planning, organizing and directing the Medical School from the ground up as he came to Duke when the Medical Center was in the idea stage. The success and development of the institution is largely due to his guidance. Dr. Davison has received a host of honors during his long career. His most recent distinction came recently when he was named the third recipient of the Certificate of Meritorious Service given by the American Academy of General Practice for his contributions toward the advancement of the general practice of medicine and surgery.

A new educational program designed to produce physicians who also are skilled research scientists has been initiated at the Duke University Medical Center. The program is intended to train more doctors in preclinical fields so that they are better equipped to apply scientific methods and knowledge in their research and teaching. Facilities for the program are housed in a new four-story addition to the medical research building. Grants totaling more than \$1 million will pay for construction and equipment and will support the first five years of operation. Dr. JAMES B. WYN-GAARDEN, associate professor of medicine and of biochemistry, has been named director of the program.

Major construction activities expected to total some \$3 million will begin late this year at the Medical Center. Plans call for an addition that will house the Duke University Center for the Study of Aging, a clinical research unit, and various diagnostic and treatment facilities. A radiation treatment and research addition to the Medical Center is now in final stages of construction, and work will begin this spring on a 22-bed expansion of the Howland children's ward.

Georgetown

The Congress of Delegates of the American Academy of General Practice conferred

Honorary Membership on Dr. Hugh H. Hussey, dean of the School of Medicine, at the Annual meeting of the AAGP in Philadelphia recently.

Illinois

Three changes in requirements for admission to the College of Medicine will go into effect in September, 1962. According to university officials the most important change is that the prospective medical student will be required to follow a sequence of study in one subject matter area. Also, the student will have to present 94 semester hours for admission instead of the current 88. These six additional hours are to be in advanced courses toward which the student must work during his first two years as an undergraduate. The final change involves the study of nuclear physics as part of an already current physics requirement.

Miami

The first Rehabilitation Center for Parkinson's disease in the country will be constructed in Miami this summer, according to university officials. Ground-breaking ceremonies for the new center, to be built close to Miami's Metropolitan Center, were held May 1. To be constructed and supported by the Florida chapter of the National Parkinson Foundation, the Center will be operated under the supervision of the division of gerontology of the University of Miami School of Medicine. Dr. SAMUEL GERTMAN, associate professor of geriatrics, is chairman of the medical advisory board. Focus will be on rehabilitation of the entire family of the Parkinson patient. The Florida chapter will also provide three fellowhips for basic and clinical studies in neurosurgery, neurology and geriatrics in connection with this program. The work of the fellowship students in Miami will be coordinated with a program of basic research at the University of Chicago, supported by the National Parkinson Foundation.

Michigan

The medical school will launch a special studies program next fall in an attempt to provide a more challenging medical education for the superior student. Approximately 10 per cent of the 200 students entering the school will be invited to participate in the program. They will be chosen on the basis of motivation, special interests within the field of medicine and exceptional intellectual capacity. Dr. John M. Weller, associate professor of internal medicine, has been named co-ordinator of the program.

New York University

Dr. S. BERNARD WORTIS, chairman of the department of psychiatry and neurology



at New York University Medical Center, has been named dean of New York University School of Medicine and Post-Graduate Medical School and deputy director of the Center. Dr. Wortis, who is the Lucius N. Littauer professor of psychiatry and professor of neurol-

Dr. S. Bernard Wortis and professor of neurology, will retain his pres-

ent departmental and academic appointments. He succeeds Dr. Donal Sheehan, who will continue in his capacity as professor and chairman of the department of anatomy.

Dr. Wortis is a consultant in psychiatry and neurology to many hospitals, including the U.S. Public Health Service, Bellevue Hospital Center; a senior consultant to the U.S. Veterans Administration and the U.S. Naval Hospital at St. Albans. Under the auspices of the World Health Organization and the Unitarian Service Committee, he has served on medical teaching missions to Austria, Poland, Finland, and Iran.

Pittsburgh

Presbyterian Hospital and the University of Pittsburgh have opened joint radiology facilities in the wing connecting the hospital and the university's Schools of the Health Professions building, according to a recent announcement. In addition to serving the hospital and the university, the new

facilities will be available to Woman's Hospital and the Eye and Ear Hospital. Approximate cost of the new area is \$1 million, including more than \$300,000 for new equipment. Dr. ELLIOTT C. LASSER, chief radiologist at Presbyterian Hospital and chairman of Pitt's department of radiology, said that the new area will contribute to increased efficiency of taking, processing, and interpreting x-ray studies. The diagnostic facilities are structured in a fashion that will permit a smooth flow of patient traffic, rapid developing facilities and viewing facilities that will accept simultaneously a full day's output of films, he added. The viewing facilities, when completed, will enable approximately 400 films to be put up at one time.

S.U.N.Y. Downstate

The 100th anniversary of medical education in Brooklyn is being celebrated this spring and fall in a centennial program sponsored by the Downstate Medical Center.

Organized in 1860 as the College division of The Long Island College Hospital, the medical school was chartered as the independent Long Island College of Medicine in 1930 and was merged with the State University of New York in 1950, becoming the first unit of the Downstate Medical Center. Over 7,000 doctors have been graduated from the Downstate Medical Center and its predecessors in the past 100 years, during which time major changes have taken place in the educational program and in the organization of the school.

A symposium on medical education and centennial dinner will be given in the fall.

Tennessee

Dr. ROLAND H. ALDEN, who became associate dean of the Graduate School of Medical Sciences January 1, has been named acting dean of the university's School of Biological Sciences. He succeeds the present dean, Dr. T. P. NASH, JR., when he retires July 1. Dr. Nash has served as dean of the school since it was organized in 1928.

Dr. Alden received his Ph.D. degree from Yale University and has been a member of the UT staff since 1942. He will retain his position as professor and chief of the division of anatomy.

Virginia

The plastic surgery program at the University of Virginia School of Medicine has been approved for residency training by the Tri-Partite Committee of the American Medical Association. This accreditation marks the founding of the first and only approved program of its kind in Virginia. It will enable surgeons to receive thorough training in this specialty, and at the completion of the two-year program, qualify for the American Board of Plastic Surgery

examinations. An integral part of the department of surgery, the division of plastic and maxillofacial surgery was established at the university in 1956 by Dr. CLAUDE C. COLEMAN, JR., associate professor of plastic surgery and chief of the division. He is also director of the head and neck tumor clinic, which he established in 1958.

Yale

Yale's Medical School Dean, Vernon W. Lippard, has been granted a five-month sabbatical leave to lecture and study new developments in medical education in Europe. The tour will take him to England and the Scandinavian countries where he is scheduled to lecture at various institutions, and confer with medical educators.

ITEMS OF CURRENT INTEREST

Dr. Fremont-Smith Retires from Macy Foundation

Dr. Frank Fremont-Smith has retired as medical director of the Josiah Macy, Jr. Foundation, after serving in that capacity for the past 24 years.

Dr. Fremont-Smith began his medical career in 1925 at the Harvard Medical School as a member of its department of neuropathology. He remained at Harvard until 1936, when he joined the Foundation.

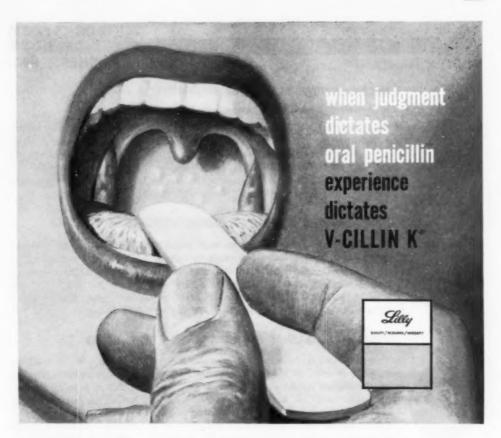
Active in the field of neurology and psychology, Dr. Fremont-Smith served as consultant to the Secretary of War from 1944 to 1945, to the Surgeon General of the U.S. Public Health Service from 1946 to 1947, and to various other government agencies. He is now devoting his interests largely to the World Mental Health Year—1960, under the World Federation for Mental Health.

Dr. Willard C. Rappleye, president to the Foundation, will serve temporarily as acting medical director.

Lederle Allocates Funds for Faculty Positions

Approximately \$280,000 has been distributed by Lederle Laboratories Division of American Cyanamid Company to 14 U.S. medical schools to support full-time faculty positions during the next three years, according to Dr. Maxwell Finland, chairman of the Awards Committee. These awards vary in amounts up to \$30,000 each and are intended to strengthen preclinical and major clinical departments by supporting individuals who have demonstrated a high quality of academic performance but who have not yet attained permanent faculty tenure.

Since the establishment of the Lederle, Medical Faculty Awards seven years ago, approximately 100 faculty members in about 60 medical schools have benefitted from the awards. Lederle also allocates approximately \$115,000 a year for the support of medical student summer research fellowships. Each medical school in the United



for maximum effectiveness Recently, Griffith¹ reported that V-Cillin K produces antibacterial activity in the serum against penicillin-sensitive pathogens which is unsurpassed by any other form of oral penicillin. This helps explain why physicians have consistently found that V-Cillin K gives a dependable clinical response.

for unmatched speed Peak levels of antibacterial activity are attained within fifteen to thirty minutes—faster than with any other oral penicillin.¹

for unsurpassed safety The excellent safety record of V-Cillin K is well established. There is no evidence available to show that any form of penicillin is less allergenic or less toxic than V-Cillin K.

Prescribe V-Cillin K in scored tablets of 125 and 250 mg., or V-Cillin K, Pediatric, in 40 and 80-cc. bottles.

 Griffith, R. S.: Comparison of Antibiotic Activity in Sera Following the Administration of Three Different Penicillins, Antibiotic Med. & Clin. Therapy, 7:No. 2 (February), 1960.
 V-CILLIN K* (penicillin V potassium, Lilly)

TEXTBOOKS FROM THE YEAR BOOK PUBLISHERS, INC.

McCOMBS' INTERNAL MEDICINE

A Physiologic and Clinical Approach to Disease



This book fulfills most adequately the requirements of students for a concise, introductory text. Emphasis is placed on the relationship of basic physiology and chemistry to the clinical characteristics of diseases and their diagnosis and treatment. The author has carefully revised the entire text. By ROBERT P. McCOMBS, M.D., Professor of Graduate Medicine, Tufts University School of Medicine. 715 pages, illustrated. Ready Summer.

SCHOTTSTAEDT'S PSYCHOPHYSIOLOGIC APPROACH IN PRACTICE

New Book By an experienced teacher of medical students. In concise, readily grasped language, the mechanisms governing the physical and mental well-being of the patient are described as a means of creating a better understanding of human behavior and its relation to health and disease. By WILLIAM W. SCHOTTSTAEDT, M.D., Associate Professor of Medicine, University of Oklahoma Medical Center. Approx. 350 pages. Ready Spring.

WHITE et al. MANUAL FOR EXAMINATION OF PATIENTS



This new book is the outgrowth of a manual used for some years in teaching at the University of North Carolina Medical School. It covers both physical and laboratory procedures, integrating also the recent advances in psychiatry, preventive medicine and the behavioral sciences. Among its many features are normal laboratory values, evaluation of children, and nutritional historytaking. By an Interdepartmental Committee of the Faculty of The University of North Carolina School of Medicine. KERR L. WHITE, M.D., Chairman. Approx. 250 pages. Ready Spring.

LERNER & LERNER'S DERMATOLOGIC MEDICATIONS



Designed for student use, this is a detailed yet concise consideration of the structural formulae and mechanism of action of present-day dermatologic drugs, including indications, contraindications, prescriptions and dosages. By MARGUERITE RUSH LERNER, M.D., Clinical Instructor of Dermatology, and AARON BUNSEN LERNER, M.D., Associate Professor of Medicine and Chief of Section of Dermatology, Yale University School of Medicine. Approx. 185 pages. Ready Spring.

HODGES et al. RADIOLOGY FOR MEDICAL STUDENTS



Thousands of students have learned their radiology with the aid of this text. Covers both diagnostic and therapeutic aspects. One of its great features is attention to illustrations. By FRED JENNER HODGES, M.D., Professor and Chairman; ISADORE LAMPE, M.D., Professor; and JOHN FLOYD HOLT, M.D., Professor; Department of Radiology, University of Michigan Medical School. 450 pages; 475 illustrations on 109 plates. \$8.50.



THE YEAR BOOK PUBLISHERS, INC.

TEXTBOOKS FROM THE YEAR BOOK PUBLISHERS, INC.

FIELDS & SEED'S CLINICAL USE OF RADIOISOTOPES

New 2nd Edition Here, in simplified language, are the essentials of nuclear medicine which every student of medicine must thoroughly understand. Both diagnostic and therapeutic applications are included. Extensively revised to keep abreast of the field's rapid progress. By 18 Authorities. Edited by THEODORE FIELDS, M.S., Assistant Director, Radioisotope Laboratory, VA Hospital, Hines, Ill., and LINDON SEED, M.D., Clinical Associate Professor of Surgery, University of Illinois. Approx. 450 pages; illustrated. Ready Summer.

HOFFMAN'S BIOCHEMISTRY OF CLINICAL MEDICINE



The popularity of this excellent text continues to grow. For one thing, it is so readable. Second, its orderly arrangement and careful clarification of difficult facets of the subject reflect the author's long experience in teaching and his training both in biochemistry and clinical medicine. By WILLIAM S. HOFFMAN, Ph.D., M.D., Professiorial Lecturer in Medicine, College of Medicine, University of Illinois. 756 pages; illustrated. \$12.00.

SULZBERGER et al. DERMATOLOGY

Essentials of Diagnosis and Treatment

New 2nd Edition A large portion of this book has been rewritten, every chapter thoroughly revised, virtually all pictures replaced by new ones. It offers a completely modern description of skin disorders, emphasizing the essentials on which sound diagnosis and therapy are based. By MARION B. SULZBERGER, M.D.*, JACK WOLF, M.D.*, and VICTOR H. WITTEN, M.D.*, with the collaboration of ALFRED W. KOPF, M.D.*, *Dept. of Dermatology and Syphilology of New York University Bellevue Medical Center and Skin and Cancer Unit of the University Hospital **Dept. of Dermatology, Beth David Hospital, New York. Approx. 600 pages; 200 illustrations, some in color. Ready Summer.

LIPMAN & MASSIE'S CLINICAL SCALAR ELECTROCARDIOGRAPHY



This book is so well-known that description is almost unnecessary. In the revised edition a wealth of new material appears, all presented in the lucid style so helpful to both instructor and student. By BERNARD S. LIPMAN, M.D., Associate in Medicine, Emory University School of Medicine; and EDWARD MASSIE, M.D., Associate Professor of Clinical Medicine, Washington University School of Medicine, St. Louis. 474 pages; 452 drawings and tracings, 70 thumbnail sketches. \$8.00.

RANDALL'S ELEMENTS OF BIOPHYSICS



A classroom-tested teaching tool which admirably fits student requirements for a simplified and concise coverage of the basic concepts of biophysics. Readily adaptable to individual teaching preferences. Stimulates student interest by making a complex subject attractive and understandable. By JAMES E. RAN-DALL, B.S.E.E., M.S., Ph.D.; Associate Professor of Physiology and Biophysics, University of Missouri Medical Center. 330 pages; illustrated. \$8.00.

200 East Illinois Street, Chicago 11, Ill.



States and Canada has been allotted one \$600 fellowship for 2-year schools, and two \$600 fellowships for 4-year schools.

Applications for Research Support Invited by Heart Association

The American Heart Association is announcing that applications from research investigators for support of studies to be conducted during the fiscal year beginning July 1, 1961, are now being accepted. The deadline for applying for research fellowships and established investigatorships is September 15, 1960. Applications for grants-in-aid must be received by November 1, 1960. Stipends in all categories have been increased this year based on the rising cost of living.

Further information and application forms regarding research awards may be obtained from the Assistant Medical Director for Research, American Heart Association, 44 East 23d St., New York 10, N.Y.

Beverage Industry Offering Research Grants

A new grant-in-aid program, through which relatively small research grants may be arranged quickly for competent scientists working in the field of alcoholism and related subjects, has been announced by the Scientific Advisory Committee of Licensed Beverage Industries, Inc.

In response to the growing need for more scientific information both as to the extent of alcoholism and as to its causes and treatments, LBI is making this program possible through a grant of \$500,000 over a five-year period. Grants will be awarded to qualified researchers in the biological and behavioral sciences who wish to make preliminary or pilot studies for the purpose of raising or clarifying particularly promising hypotheses. It is expected that grants will range from \$5,000 to \$10,000 and that they will run for one year. Renewal of the grant may be considered.

Detailed information and application forms may be obtained by writing to the Scientific Advisory Committee of the Licensed Beverage Industries, Inc., 155 E. 44th St., New York, 17, N.Y.

Medical Documentary To Be Telecast

The practice of medicine in widely scattered regions of the United States will be the subject of a special hour-long documentary to be telecast over the NBC-TV network on Friday, May 27, at 8:30 p.m. (EST). To be telecast in color as well as black and white, the program is another in the "March of Medicine" series produced and sponsored by Smith Kline & French Laboratories in cooperation with the American Medical Association.

Entitled, "MD USA," the special report will depict the work of five American physicians in various geographical areas of the country as they provide care for a wide array of patients. "Md International," last year's "March of Medicine" entry, won the Peabody Award for its contributions to international understanding.

M.I.T. Offering Summer Course to Medical Researchers

The department of biology at the Massachusetts Institute of Technology has planned a special summer course on "Modern Research Methods in Biology and Medicine," from July 5 to 15, this year. The purpose of this course is to make advances in electronics and other fields of instrumentation available to medical research workers and biologists. Noting that instrumentation has led to a revolutionary development in the field of physical sciences, M.I.T. officials believe it will be of similar importance in the life sciences, leading to new research methods and diagnostic procedures.

The 1960 program will be under the direction of Dr. Kurt S. Lion, associate professor of applied biophysics; lectures will also be given by specialists from M.I.T. and

other universities. A limited number of partial scholarships are available to faculty members of universities. Application forms and full information may be obtained from Dr. James M. Austin, Director of the Summer Session, Massachusetts Institute of Technology, Cambridge 39, Mass.

Memorial Program To Cover Mental Health Concepts

The integration of mental health concepts with the theory and practice of the human relations professions is the subject of a lecture program which will take place between April and November this year. The program, sponsored by Bank Street College of Education, is a memorial to the late Dr. Ruth Kotinsky, author, educator, and psychological research specialist. The lectures, covering medicine, religion and law, education, dentistry and nursing, and psychology and community psychiatry, will be given at the Carnegie Endowment International Center, 345 East 46th Street, New York City.

Admission is free, and tickets may be obtained from Bank Street College of Education, 69 Bank Street, New York 14, N.Y.



PUBLICATIONS

Useful information for both medical educators and students is published by the Association of American Medical Colleges. These publications may be obtained from the Association headquarters office, 2530 Ridge Avenue, Evanston, III.

Books and Pamphlets

Admission Requirements of American Medical Colleges-1958-59 (\$2.00).

History of the Association of American Medical Colleges-1876-1956

The National Health Service of Great Britain (\$1.00).

El Estudiante de Medicina (\$1.00)

Suggestions for Supplementing the Medical Curriculum in Time of National Emergency

A Study of Medical College Costs (\$1.50)

The Journal of MEDICAL EDUCATION

A monthly journal devoted exclusively to medical education.

Subscription rates: \$7 per year, \$13.50 two years, \$19.50 three years. Foreign \$8 per year, \$15.50 two years, \$22.50 three years. Pan America and Canada \$7.50 per year, \$14.50 two years, \$21.00 three years. Single copies \$1.00.

Journal supplements available:

Education of Physicians for Industry (\$2.00).

Support of Research by American Cancer Society (\$1.00).

Survey of Women Physicians graduating from Medical School 1925-40 (\$1.00).

Medical Education for Foreign Scholars in the Medical Sciences (\$1.50).

Teaching Institute Reports (\$2.00 paperbound, \$3.00 clothbound).

Report of the Conference on Preventive Medicine in Medical Schools (Report of the 1952 Institute).

The Teaching of Physiology, Biochemistry and Pharmacology (Report of the 1953 Institute).

The Teaching of Pathology, Microbiology, Immunology and Genetics (Report of the 1954 Institute).

The Teaching of Anatomy and Anthropology in Medical Education (Report of the 1955 Teaching Institute).

The Appraisal of Applicants to Medical School (Report of the 1956 Institute).

The Ecology of the Medical Student (Report of the 1957 Institute).

Report of the First Institute on Clinical Teaching (Report of the 1958 Institute).

Medical Audio-Visual Institute Publications

Film Catalog, Fall 1955 and Supplements.

Films in Psychiatry, Psychology and Mental Health (available from the Health Education Council, 92 Belmont Drive, Livingston, N.J.).

Films in the Cardiovascular Diseases (Part I available from the American Heart Assn.), 44 E. 23rd St., New York 10, N.Y. (\$2.00).

Part II available from the Medical A-V Institute (\$2.00).

Publications of Related Organizations

Hospitals Participating in the Matching Program 1959 (NIMP).

Results of the Matching Program 1959 (NIMP publication).

The Student and the Matching Program 1959 (NIMP publication).

Medical College Admission Test—Bulletin of Information 1959 (Educational Testing Service publication).

Psychiatry in Medical Education—1951 Conference (\$1.00).

The Psychiatrist: His Teaching and Development—1952 Conference (\$2.50).

(The above can be obtained from: American Psychiatric Assn., 1785 Massachusetts Avenue, NW, Washington, D.C.)

Individual Membership

in the

Association of American Medical Colleges

In recent years the activities of the Association of American Medical Colleges have expanded far beyond the original considerations of administrative problems to the many and varied problems of medical education as encountered by the entire medical school faculty.

The expansion of activities has been due to the growing complexity of medical education—the swift development of the medical sciences, the rapid accumulation of new knowledge to be taught, the pressure for more graduates, the changing patterns of medical eare, and countless other factors.

Because of these factors, the AAMC recognizes the need for a professional organization to represent not only the medical schools but the faculty members of these schools. Through the offering of individual membership, the AAMC provides you with the opportunity to exchange ideas, opinions and information through the Annual Meeting, Teaching Institutes, and other activities of the Association.

The AAMC also encourages you to attend the Annual Meeting, not only to meet with others who are teaching in your field and discussing the educational problems that are peculiar to it, but also with the idea of becoming familiar with the entire field of medical education as one of society's most important enterprises. The time has come when teachers of medicine must meet together and discuss the problems and activities that are peculiar to medicine as education just as they are accustomed to meet and talk about medicine as science.

As an Individual Member you are entitled to receive *The Journal of Medical Education*, the only publication devoted exclusively to medical education. The Journal also carries the latest news from the medical schools and provides a valuable service through its Personnel Exchange column. You receive the yearly *Directory*, the Proceedings of the Annual Meetings, and *The Medical Mentor*, a newsletter which will keep you informed on items of current interest in the field of medical education, both nationally and internationally.

Individual Membership, at only \$10 a year, is open to any person who has demonstrated a serious interest in medical education over a period of years. All the privileges of membership and a provisional membership eard are granted immediately after payment of the \$10 fee, although confirmation must await official action at the next Annual Meeting.

To obtain membership, fill out the application form below, append check for \$10, and return to the Association's central office at 2530 Ridge Ave., Evanston, Ill.

INDIVIDUAL MEMBERSHIP APPLICATION ASSOCIATION OF AMERICAN MEDICAL COLLEGES

2530 Ridge Ave., Evanston, Ill.

Name:			
Mailing Addre	955:		
	(City)	(Zone)	(State)
Field of medic	cal education in wh	nich chief interest lie	95:
C 11 .1	ner connection:		

PERSONNEL EXCHANGE

Faculty Vacancies

CHILD PSYCHIATRIST: Assistant or associate professor in child psychiatry required. This position will be that of geographical consultant with a salary (within the range \$7,700 to \$10,200) according to experience and qualifications, and private consulting privileges. Applications to R. Bruce Sloane, M.D., Department of Psychiatry, Queen's University, Kingston, Ontario.

PSYCHIATRIST: Lecturer in psychiatry required. Salary (within range of \$6,000 to \$8,000) and consulting privileges, according to experience and qualifications. Applications to R. Bruce Sloane, M.D., Department of Psychiatry, Queen's University, Kingston, Ontario.

HEMATOLOGY: M.D. (young) to do research in modern diagnostic methods in hematology and allied diseases in collaboration with medical and engineering groups. Address: V-83.

MEDICAL DIRECTOR: Coordinator of medical education for a 300-bed major teaching hospital of a New England medical school. Academic appointment dependent upon qualifications. Consultation practice or research possible. Address; V-84.

PSYCHIATRIST: Board certified with university and state hospital experience to serve as supervisor of psychiatric residents for newly approved three-year program with time divided equally between University of Washington and Northern State Hospital. Position will carry faculty rank at the medical school and residence in Seattle is feasible. Present staff at Northern State Hospital is currently expanding from 25 full-time positions to an authorized strength of 35 positions for 1670 patients. Salary \$14,220-\$16,836. Address: Charles H. Jones, M.D., Box 309, Sedro Woolley, Washington.

MEDICAL DIRECTOR: Professional Services, large affiliated VA General Hospital. Certified specialist with more than casual experience residences and research, and flair for administration. Faculty appointment appropriate for qualifications. Active expanding research program. Ambitious, mature personality. Salary, \$14,685-\$16,000. Address: V-85.

Obstetrician-Gynecologist: Full-time teacher, administrator and investigator for department with active student and house staff program in well known medical school and affiliated hospitals in New York City. Must be interested in academic medicine. Rank and salary will depend upon qualifications. Age—preferably under 35. Address: V-86.

BACTERIOLOGIST: University Hospital at Saskatoon, Saskatchewan, Canada, now has a vacancy for an assistant bacteriologist. This appointment also carries a university teaching position. Salary \$8,000-\$10,000 per annum. Applicants should have hospital and teaching experience. Applications stating date of birth, qualifications, experience, present appointment, and the names of three references should be sent to the Director of Bacteriology, University Hospital, Saskatoon, Saskatchewan, by April 15, 1960.

Neurologist-Infectionist: Two geographical fulltime positions in a 400-bed general hospital with medical school faculty appointments. Duties to include teaching; research will be encouraged. Large Eastern city. Address: V-87.

INTERNIST: Board eligible or board certified, to work with a team in the supervision and management of cardio-vascular patients on a home care research and demonstration project at East Coast medical school. Training in cardiovascular diseases desirable. Geographic full-time appointment available. Address: V-88.

Assistant Pathologist: Three-hundred bed GM & S university affiliated hospital. Salary rate varies from \$9,890.00 to \$11,355.00 plus 15% if certified by the American Board of Pathology. Apply to J. Mendeloff, M.D., VA Hospital, Atlanta, Ga.

DIRECTOR, MEDICAL EDUCATION: Available July 1, 1960. Newly created position; 312 bed general hospital, fully approved, school of nursing; intern and resident training program. Duties include supervision of intern and resident training, supervision of medical library, serve as chairman of department of medical education, and as coordinator of conferences and all formal staff meetings. Salary open. Apply to Paul G. Wedel, Administrator, The Williamsport Hospital, 777 Rural Ave., Williamsport, Pa.

Physiatrist: Board certified or eligible, for academic appointment in rapidly expanding new department; medical and physical therapy schools, large East Coast city. Excellent opportunity to combine teaching, clinic work and private practice. Address: V-89.

BIOCHEMIST-MICROBIOLOGIST: Position available in medical school pharmacology department for research associate in problems concerned with microbial metabolism, particularly degradation of pharmacologically active compounds. Ph.D. or M.D. with training in microbiology and enzymology. Salary \$6,500–8,050 depending on background. Faculty rank with teaching activities optional. Address: V-90.

DIRECTOR OF MEDICAL EDUCATION: Internal medicine specialist preferred for full-time position in 320-bed hospital. Hospital has university affiliation. Beginning salary \$18,000 per year. Address: V-91.

PSYCHIATRISTS: Geographical full-time faculty appointments available; one position open in Division of Child Psychiatry and two positions open in Division of Adult Psychiatry, University of Minnesota Medical School. Academic rank and university salary open to negotiation on basis of professional attainments. Opportunities for teaching, research and, some private practice. Write to Dr. Donald W. Hastings, Box 393 Mayo Memorial Hospital, Minneapolis 14, Minn.

BIOSTATISTICIAN: Ph.D. Research in child growth studies; opportunities for varied consultation and teaching at Dental School located in large medical center; modern computing facilities available. Salary, from \$9,000 and academic rank dependent upon qualifications. Write to Dr. Bhim Savara, Head of Dept., Child Study Clinic, University of Oregon Dental School, 611_S.W. Campus Drive, Portland_1, Orgeon.

To aid in solution of the problem of faculty vacancies, MEDICAL EDUCATION will list persons and positions available, as a free service. The school department or person may have the option of being identified in these columns or of being assigned a key number for each position listed. Mail addressed to key numbers will be forwarded to the person or department listing the request.

Information for these columns should reach the Personnel Exchange, Journal of Medical Education, 2530 Ridge Avenue, Evanston, Illinois, not later than the 10th of the month which precedes the month in which the listings will appear.

Personnel Available

INTERNIST-GASTROENTEROLOGIST: Age 42. Board certified in internal medicine and in gastroenterology. Training and experience include 4 years as Mayo Foundation Fellow, full-time instructor in gastroenterology in leading university, clinical investigation and private practice. Trained in all gastroenterological techniques and bone marrow interpretation. Qualified in hematology, peripheral vascular diseases and rheumatology. Desires academic position in internal medicine, gastroenterology, comprehensive medical care section, as Assistant Dean, or as Director of Medical Education in teaching hospital. Address: A-419.

MICROBIOLOGIST-CLINICAL PATHOLOGIST: M.D., Ph.D., age 54, married. Wide experience in teaching and research in the United States. Returning after several years of teaching in medical schools in the Far and Middle East. Textbook in course of publication. Desires research or teaching position in medical school or in teaching hospital. Address: A-420.

PATHOLOGIST-VIROLOGIST: DVM, Ph.D. Experience in comparative pathology, virology and tissue culture techniques. Also considerable experience in teaching experimental pathology to medical students. Desires teaching appointment in a medical school that would provide opportunity for completion of courses leading to M.D. degree. Address: A-421.

PSYCHIATRIST: Board certified, with training in both general clinical psychiatry and public health psychiatry (M.P.H. degree). Six years' experience in administering a community-oriented psychiatric training program in an academic setting. Broad range of personal service in teaching, supervisory, and consultative capacities. Dynamic orientation. Numerous research publications. Age under 40. Currently assistant professor at medical school. Desires full-time faculty appointment at higher level. Address: A-422.

PSYCHIATRIST: Board certified in psychiatry and child psychiatry (pending). Eight years experience in teaching at student and resident level in adult and child psychiatry in academic setting. Broadly experienced in teaching, supervisory, and consultative capacities. Analytic orientation. Nine publications. Experience in administering child guidance clinic and in community aspects of psychiatry. Has held position as associate professor of psychiatry; wishes to head up division of child psychiatry in medical school in either true or geographic full-time position. Metropolitan area preferred. Age 45; married; 4 children. Address: A-423.

Physiologist-Pharmacologist: M.D., Ph.D., age 40 Teaching and research experience includes six years in pharmacology and six years in physiology, with one year training in laboratory of high polymer chemistry. Desires academic and research position in physiology or pharmacology department. Address: A-424.

INTERNIST: Board certified, university trained, with one year training in clinical cardiology and one year in cardiovascular laboratory. Presently holding position as university instructor. Desires faculty appointment with teaching and research in clinical cardiology and electrocardiography. Address: A-425.

Anatomist: Ten years teaching experience; all phases of medical school anatomy. Broad research interests with grant support in gross anatomy and histology. Desires university appointment. Northeast or northwest preferred. Address: A-426.

ZOOLOGIST: Ph.D., age 43, married, family. Desires teaching microanatomy in medical school. Experience: medical school teaching (medical parasitology); USPHS senior assistant scientist, foreign experience as malariologist; undergraduate teaching, including 6 years instructing pre-medical students in histology. Publications, active research program; current interest: histochemistry techniques in study of cellular basis of resistance to a parasitic infection. Willing also to instruct in parasitology, if situation permits. Available with one semester notice to present employer. Address: A-427.

ANATOMIST: M.B., Ch.B. (Witwatersrand, Johannesburg, South Africa), F.R.C.S. (Edinburgh). Age 52, desires position in medical school as senior lecturer in anatomy. Presently located at University of The Witwatersrand as official lecturer in anatomy; part-time senior lecturer in gross and applied anatomy since 1949. Publications. Surgeon to Union Defence Forces, 1940–46 with rank of major. In private practice as a general surgeon since 1946. Address: A-428.

Pharmacologist-Clinical: M.D., Ph.D., age 33, licensed physician. Publications, academic and industrial experience, some psychiatric training. Desires teaching position. Address: A-430.

Human Geneticist: Ph.D., age 36, seven years experience at leading human genetics center, including heredity clinic service, population surveys of hereditary traits, and statistical analyses. Fourteen publications. Desires permanent university position, preferably research and teaching. Address: A-431.

Certified Internist: Age 38, experienced in diabetes, endocrinology, radioisotopes (licensed by AEC). Several years direction of medical residency training program, and radioisotope unit in large teaching hospital, and Assistant Professor of Medicine in charge of student diabetes clinics. Now in private practice. Desires return to full-time teaching hospital and/or medical school. Address: A-433.

Gross Anatomist: Ph.D. Eight years teaching experience; desires academic position in medical or dental school. Available summer 1960. Address: A-434.

Physiologist-Biochemist: Ph.D. Faculty member medical school. Interdisciplinary major grant research program (3 technicians) in basic and clinical aspects of endocrine physiology, metabolism, biochemistry. Publications, societies, radioisotope experience, training in statistical design. References. Desires faculty career appointment teaching physiology and/or biochemistry with facilities and climate to develop research program. Address: A-435.

INTERNIST: M.D., age 35. Currently on faculty of Eastern medical school. Experience in private practice and industrial medicine. Eight months experience and training in psychiatry. Desires faculty appointment with opportunity for clinical investigation in cardiovascular diseases, as well as teaching general medicine in teaching hospital. Address: A-436.

BIOCHEMIST-ENZYMOLOGIST: Six years teaching and research experience in medical school. Currently assistant professor in Eastern medical school. Available summer, 1960. Desires relocating with appointment in medical school or research institute. Address: A-437.

Physiologist: Ph.D., leading university. Well trained in biological, physical and chemical sciences. Highest scholastic honors, scholarships, former National Research Council Fellow. Well developed research program on the physiology of growth and aging. Offices held in national scientific societies. Present appointment, associate professor in medical college. Currently in charge of teaching. Seeking appointment with major administrative-teaching responsibilities, with opportunity to continue expanding research study, preferably in the West. Minimum entering salary \$12,000. Available Fall, 1960. Address: A-438.

PEDIATRICIAN: Professor and department head. Wishes to relocate for personal reasons. Ten years at present post. Age 43. Numerous publications. Would first consider university or educational foundation position; then, hospital educational program or industry affiliation. Address: A-439.

SURGEON: Cardiovascular and thoracic. M.D. 1947 American medical school. Presently located at Canadian hospital as research fellow in cardiovascular surgery. Desires position in thoracic and cardiovascular surgery, either at clinical level, or in teaching and research. Diplomate, American Board of Surgery. Address: A-440.

HISTOLOGIST-ENDOCRINOLOGIST: Also histochemistelectron microscopist. Age 32; Ph.D., Harvard. Publications, grants and cancer research. Six years teaching experience in histology, embryology and histochemistry. Desires associate professorship or full time research position in a medical school in department of anatomy, biochemistry, pathology or allied clinical science. Address: A-441.

Interested in all phases of clinical, laboratory, and research hematology, seeking academic position. Experience

includes 6 years academic type practice in internal medicine and hematology; brief private practice; research during military service. Address: A-442.

Internist: Experienced in teaching, clinical investigation (metabolism), patient care, and administration. Desires full-time post with teaching hospital-medical school. Age 40. Address: A-443.

Physiologist-Pharmacologist: Ph.D., 1954. Male, family. Eleven years teaching experience, currently teaching physiology in dental school. Desires academic position with or without research opportunities. Address: A-444.

Anatomist: M.B.B.S., University of Karachi, 1955. Four years teaching experience. Currently with anatomy department in a Pakistan medical school. Desires anatomy instructorship in medical school or university, preferably in northern United States, and opportunity to do summer graduate work. Address: A-445.

INTERNIST: Age 33; certified in medicine. Trained in clinical medicine, teaching and research at university hospital and the N.I.H. Director of medical education at university affiliated hospital in New York City for past three and one-half years. Experience in private practice and epidemiology. Desires geographic full-time position at medical school or hospital, with opportunities for teaching and research as well as consultation and imited practice privileges. Address: A-446.

PREVENTIVE MEDICINE PHYSICIAN: M.D., M.P.H. and Dr. P.H. Desires teaching position on medical school faculty. Numerous publications. Previous teaching and health department experience. Special interests are epidemiology, biostatistics, and preventive medicine. Address: A-447.

PSYCHIATRIST: Age 35; board certified, prefers geographic full-time position at level of assistant professor or higher. Presently teaching part-time as clinical instructor. Experience as hospital out-patient clinic director and director of professional education in State hospital. Established in-patient adolescent service. Married, 5 children. Five articles. Address: 4-448.

BACTERIOLOGIST-IMMUNOLOGIST: Ph.D. Married, family. Eleven years experience in clinical bacteriology, serology, and blood grouping and as Director of the blood bank. Extensive teaching experience at medical school level. Publications. Desires hospital position with research potential and university faculty status. Address: A-449.

INDEX TO ADVERTISERS

Abbott Laboratories	x-xi	Mead Johnson & Company	4th Cover
Appleton-Century-Crofts, Inc	iii	The C. V. Mosby Company	xxvi-xxvii
Bausch & Lomb Optical Co	iv	Nuclear-Chicago Corporation	xvi-xvii
Burroughs Wellcome & Co., Inc	xxiii	Ortho Pharmaceutical Corp	ix
Ciba Pharmaceutical Products, Inc.	xxv	W. B. Saunders Company	1st Cover, i
Clay-Adams, Incorporated	xiv	Tampax Incorporated	xiii
Eaton Laboratories	xv	Taylor Instrument Companies	xviii
Lea & Febiger	vii	Tri-Chem, Incorporated	XXXV
Eli Lilly and Company	xxxi	The Upjohn Company	v
J. B. Lippincott Company	viii	The Williams & Wilkins Company	
McGraw-Hill Book Company, Inc.	2nd Cover	Wyeth Laboratories	XX
MD Publications, Inc	xxi	The Year Book Publishers, Inc	xxxii-xxxiii



DREAMS NEED SOME HELP. Saving with U.S. Savings Bonds is a good way to turn a dream into reality. The Payroll Savings Plan makes saving automatic.

Let the Government Pay You for saving for something you want

An installment plan that pays you interest sounds surprising, doesn't it? That's what happens when you buy U.S. Savings Bonds. They now pay you $3\frac{3}{4}\%$ compounded semi-annually when held to maturity. With this new rate, \$3 becomes \$4 fourteen months faster than before—in just 7 years, 9 months. Make your dreams come true, faster than ever, with U.S. Savings Bonds.

ADVANTAGES WORTH THINKING ABOUT

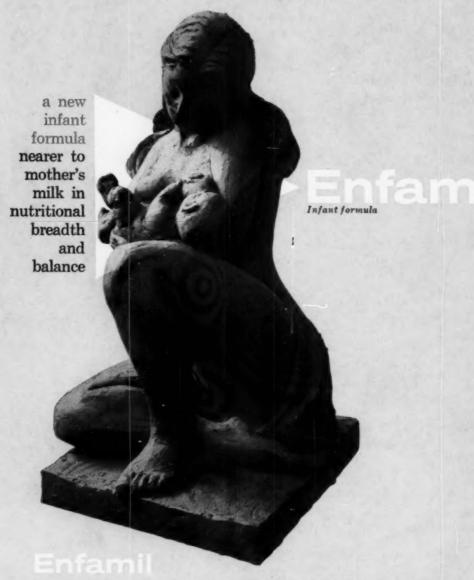
• You can save automatically with the Payroll Savings Plan • You now earn $3\frac{3}{4}\%$ interest to maturity • You invest without risk under a U.S. Government guarantee • Your money can't be lost or stolen • You can get your money, with interest, anytime you want it • You save more than money—you help your Government pay for peace • Buy Bonds where you work or bank.

NOW every Savings Bond you own—old or new—earns ½% more than ever before.

You save more than money with U.S. Savings Bonds

The U.S. Government does not pay for this advertising. The Treasury Department thanks The Advertising Council and this magazine for their patriotic donation.





NEARER ... in caloric distribution of protein, fat and carbohydrate NEARER ... in vitamin pattern (vitamin D added in accordance with NRC recommendations)

NEARER ... in osmolar load

ENFAMIL IS ALMOST IDENTICAL to mother's milk in . . .

- ratio of unsaturated to saturated fatty acids
- · absence of measurable curd tension . . . enhances digestibility

*Trademark

